# **RigExpert<sup>®</sup> WTI-1**

**Operating via the Internet** 

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#### 1. Operating via the Internet

#### **IP** address

For connecting to your WTI-1 via the Internet, you should have a routable (or "public" or "external") IP address (either static or dynamic) at a place where your WTI-1 is installed. You may receive information about your IP address from your ISP (Internet Service Provider). As an example, your public IP address may be 32.179.22.11. To operate via the Internet, you should configure your ShackLink software to connect to this IP address.

#### Data forwarding

Typically, a home network has the following structure: all desktops, laptop computers, tablets, as well as smart TVs and other equipment are connected to a Wi-Fi router. The router provides access to the Internet for all these devices. To access your WTI-1 from the Internet, you will need to configure your wireless router. This will allow the ShackLink software running on a remote computer exchange data with a WTI-1 device located in your local network.



There are at least two ways of doing this:

1. Enable the DMZ ("Demilitarized Zone") feature in your router, so all incoming data requests are redirected to a specified device in your local area network.

Here is an example configuration for wireless routers based on the DD-WRT software:

dd-wr	t.com	CC	ontrol pa	anel	Tir	Firr me: 14:57:48 up 1 day,	nware: DD-V 14 min, load	VRT v24-sp2 (02/11/13) std   average: 0.06, 0.06, 0.05   WAN IP
Setup Wireless	s Services	Security	Access Restricti	ions 🛛	AT / QoS	Administration	Status	
Port Forwarding	Port Range Fo	rwarding	Port Triggering	UPnP	DMZ	Qo5		
Demilitarized Z	one (DMZ)						Help	more
DMZ Use DMZ DMZ Host IP Address		Enable 192.168.0.	Disable			D Ei sj w	MZ: nabling this o pecified host ill be accessit	ption will expose the to the Internet. All ports ole from the Internet.
	Save	Apply Set	ttings Cancel C	hanges				

Another example shows a similar configuration for a TP-Link router:

TP-LIN	C	
Status		
Quick Setup	DMZ	
QSS		
Network	Current DMZ Status:   Enable Disable	
Wireless	DMZ Host ID Address 400 400 0 Z	
DHCP	192. 108.0.7	
Forwarding		
- Virtual Servers	Save	
- Port Triggering		
- DMZ		
- UPnP		
Security		
Parental Control		
Access Control		
Advanced Routing		
Bandwidth Control		
IP & MAC Binding		
Dynamic DNS		
System Tools		

The settings for other models of wireless routers are very similar. In both examples, the ShackLink software will access your WTI-1 device with the IP address of 192.168.0.7.

2. If you do not wish to forward all data traffic to your WTI-1 device, use a "port forwarding" method.

The following picture shows settings for a DD-WRT based routers:

dd-wr	t.comc	ontrol pa	anel	Time: 15:51:11 up :	Firmware: DD-W 1 day, 1:08, load	RT v24-sp2 (02/11/13) std average: 0.00, 0.02, 0.04 WAN IP: 217-25-253-55
Setup Wireles	s Services Security	Access Restrict	ions NAT / QoS	Administratio	n Status	
Port Forwarding	Port Range Forwarding	Port Triggering	UPnP DMZ	Qo5		
Port Forwardin	g				Help	more
Application       WTI cmd       WTI audio       WTI CW/PTT	Protocol Source Net	Port from         IP A           11000	ddress Port 192.168.0.7 1 192.168.0.7 1 192.168.0.7 3	to Enable	Port Forward Certain applica open specific p function correc applications inc online games. V certain port cor Internet, the ro to the compute security concer limit port forwa you are using, checkbox after	Ing: tions may require to orts in order for it to tty. Examples of these lude servers and certain When a request for a mes in from the bouter will route the data r you specify. Due to rns, you may want to rding to only those ports and uncheck the <i>Enable</i> you are finished.
	Ac	d Remove				
	Save Apply S	Settings Cancel C	hanges			

Another example is for a TP-Link router:

Virtual Servers         ID Service Port       Internal Port       IP Address       Protocol       Status       Modify         1       11000       192.168.0.7       TCP       Enabled       Modify Delt         2       11000       11000       192.168.0.7       UDP       Enabled       Modify Delt         3       8765       8765       192.168.0.7       UDP       Enabled       Modify Delt         Add New       Enable All       Disable All       Delete All       Modify Delt         rol       vtrog       Next       Next       Next
Virtual Servers         ID Service Port       Internal Port       IP Address       Protocol       Status       Modify         1       11000       192.168.0.7       TCP       Enabled       Modify Delty         2       11000       192.168.0.7       UDP       Enabled       Modify Delty         3       8765       8765       192.168.0.7       UDP       Enabled       Modify Delty         add New       Enable All       Disable All       Delete All       Modify Delty         rol       vtring       Next       Next       Next
Virtual Servers         ID Service Port Internal Port IP Address Protocol Status Modify         1       11000       192.168.0.7       TCP       Enabled       Modify Delty         2       11000       11000       192.168.0.7       UDP       Enabled       Modify Delty         3       8765       8765       192.168.0.7       UDP       Enabled       Modify Delty         ing       Add New       Enable All       Disable All       Delete All         Previous         Next
Virtual Servers         ID       Service Port       Internal Port       IP Address       Protocol       Status       Modify         1       11000       192.168.0.7       TCP       Enabled       Modify Deli         2       11000       11000       192.168.0.7       UDP       Enabled       Modify Deli         3       8765       8765       192.168.0.7       UDP       Enabled       Modify Deli         ing       Add New       Enable All       Disable All       Delete All       Modify Deli         trol       rol       Next       Next       Next       Next
Virtual Service Port       Internal Port       IP Address       Protocol       Status       Modify         1       11000       192.168.0.7       TCP       Enabled       Modify Dely         2       11000       192.168.0.7       UDP       Enabled       Modify Dely         3       8765       8765       192.168.0.7       UDP       Enabled       Modify Dely         ing       Add New       Enable All       Disable All       Delete All       Modify Dely         trol       Previous       Next       Next       Next       Next
ID     Service Port     Internal Port     IP Address     Protocol     Status     Modify       1     11000     192.168.0.7     TCP     Enabled     Modify Deliver       2     11000     11000     192.168.0.7     UDP     Enabled     Modify Deliver       3     8765     8765     192.168.0.7     UDP     Enabled     Modify Deliver       ing     Add New     Enable All     Disable All     Delete All
ID     Service Port     Internal Port     IP Address     Protocol     Status     Modify       1     11000     192.168.0.7     TCP     Enabled     Modify Delty       2     11000     11000     192.168.0.7     UDP     Enabled     Modify Delty       3     8765     8765     192.168.0.7     UDP     Enabled     Modify Delty       3     8765     8765     192.168.0.7     UDP     Enabled     Modify Delty       Add New     Enable All     Disable All     Delete All     Image: Service All Service Al
1       11000       192.168.0.7       TCP       Enabled       Modify Delty         2       11000       11000       192.168.0.7       UDP       Enabled       Modify Delty         3       8765       8765       192.168.0.7       UDP       Enabled       Modify Delty         ing       Add New       Enable All       Disable All       Delete All       Image: Construct of the second
2 11000 11000 192.168.0.7 UDP Enabled Modify Delt 3 8765 8765 192.168.0.7 UDP Enabled Modify Delt Add New Enable All Disable All Delete All Previous Next
3 8765 8765 192.168.0.7 UDP Enabled Modify Dela Add New Enable All Disable All Delete All Previous Next
Add New Enable All Disable All Delete All Previous Next
Add New Enable All Disable All Delete All Previous Next
Add New Enable All Disable All Delete All Previous Next
Previous Next
Previous Next

In the above examples, all incoming requests to a TCP port 11000, as well as to UDP ports 11000 and 8765, are forwarded to your WTI-1 device with IP address of 192.168.0.7. Wireless routers from other manufacturers may be set up in a similar way.

Please refer to the User's Manual of your WTI-1 device if you need to find or change TCP and UDP port numbers. However, it is recommended to use default values.

### 2. Dynamic DNS configuration

In some cases, an ISP (Internet Service Provider) is only offering a so-called "dynamic" IP address to their customers. This means that this IP address may change periodically (once a day, for instance). RigExpert WTI-1 implements a "Dynamic DNS" feature which is able to track these changes. A free Dynamic DNS service, www.noip.com, is used in the WTI-1.

Advantage of Dynamic DNS is that you do not need tracking the changes of the external IP address. It is enough to remember the name of the host. WTI will update the IP address automatically when it changes.

First, register at the www.noip.com website and receive a host name for your WTI-1 device (such as "yourhostname.ddns.net" in this example). Do not forget your login and the password.

Connect the WTI-1 to your computer by using a USB cable and run the WTI Configurator program. Switch to the "DDNS" tab:

WI-FI	Networking	Permissions	Connection	DDNS	Files	Status
Use dyr	namic DNS:	<b>V</b>				
Choose	service:	No-IP (www.n	oip.com)			
Dynami	c DNS address:	yourhostname	.ddns.net			
Dynami	c DNS login:	your login				
Dynami	c DNS password:	your password	9			
				Apply	· ) [	Restore

Enable the Dynamic DNS client by checking the corresponding check box. Enter the host name, as well as the login and the password and press Apply. Disconnect your WTI-1 from your computer to enable normal operation.

In the ShackLink software, use "yourhostname.ddns.net" (without quotes) instead of a numerical IP address of your WTI-1 device.

#### 3. Delays and buffering

Audio data from your WTI-1 is sent to the ShackLink software in a form of packets of data, generated with regular intervals of time. The same format is used for sending data in reverse direction. However, due to delay in the Internet channels, packets are arriving irregularly.

To compensate this effect, these packets are buffered at the receiving side. The size of the buffer should be increased if the audio quality is not good enough. There are two buffers in the system: one of them is located in the memory of your WTI-1, and another one is allocated by the ShackLink software.

#### WTI-1 buffering configuration

To change the size of the transmit buffer, open the ShackLink Settings window (Tool  $\rightarrow$  Settings) and choose the Network tab.

Serial ports Netv	vork Audio General	
WTI address	192.168.0.7	
WTI password	test1	
WTI audio TX bufferi	ng 🗌	- 200 msec
Command port (TCP)	11000	
Audio port (UDP)	11000	
PTT/CW port (UDP)	8765	
	Export location Import loca	ation

Select a buffer size in milliseconds and press the Apply button. The total audio delay will be the sum of a regular Internet delay plus the buffer size:



#### ShackLink buffering configuration

For the receiving buffer configuration, open the ShackLink Settings window (Tool-Settings) and choose the Audio tab:

Serial ports	Network Audio General
Audio input	Переназначение звуковых устр Input 🔻 Rescan
Audio output	Переназначение звуковых устр Output 🔹
Audio RX bufferin	ng 200 msec
Sample rate	12000 🔹
Codec	PCM 🔹
	Windows audio devices
odec	PCM        Windows audio devices

Select a buffer size and press Apply to make this setting active. The following picture illustrates delays of the audio received from your transceiver:



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RigExpert WTI-1 Wireless Transceiver Interface is made in Ukraine.



24-Nov-2014