

# **ENGINEERING BULLETIN**

## **Remote IP Telephone Router Setup Guide**

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**SPECIAL NOTICE:** If the System is equipped with Telephony over Transmission Control Protocol/Internet Protocol (TCP/IP) and Session Initiation Protocol (SIP) wired and/or wireless facilities, the user may experience certain compromises in performance, reliability and security due to transmission facilities QOS and bandwidth problems, even when the equipment performs to the specification.

**USER(S) ACKNOWLEDGES THAT THEY ARE AWARE OF THESE RISKS AND THAT THEY HAVE DETERMINED THESE RISKS ARE ACCEPTABLE FOR THEIR APPLICATION OF THE EQUIPMENT. USER(S) ALSO ACKNOWLEDGE(S) THAT THEY ARE SOLELY RESPONSIBLE FOR ENSURING THAT THEIR NETWORKS AND TRANSMISSION FACILITIES QOS AND BANDWIDTH ARE ADEQUATE FOR THE PURPOSE INTENDED AND THEIR NETWORKS AND TRANSMISSION FACILITIES ARE ADEQUATELY SECURED AGAINST UNAUTHORIZED INTRUSION.**

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# Pre-Installation

## Overview

This engineering bulletin is designed to provide Iwatsu Distributors with Linksys® and D-Link® router examples for home router configuration that are commonly used to deploy Iwatsu IP telephones in a Non-VPN environment. Iwatsu Voice Networks does not provide support for the configuration of these routers.

**Note:**

The quality of Iwatsu's IP/SIP-based applications is dependant upon variables such as available bandwidth, network latency, and quality of service (QoS). Each of these variables is controlled by the LAN/WAN administrator and/or carrier. Because these variables are not under Iwatsu's control, Iwatsu cannot guarantee the performance of an Iwatsu IP/SIP product deployed on an IP network.

ONLY THE ROUTERS AND OPERATIONS LISTED IN THIS DOCUMENT HAVE BEEN TESTED BY IWATSU. IF A ROUTER OR OPERATION IS NOT LISTED IN THIS DOCUMENT IT HAS NOT BEEN TESTED.

## Required Information

**This document is intended for Non-VPN IP telephone configuration.**

**Gather the following information:**

1. **Connection type** (VPN or Non-VPN)
2. **IP address** Information.
  - **Static IP address, Subnet Mask, and Default Gateway** for the telephone.
  - Iwatsu suggests that you use a static IP address for a telephone at the remote location. Static IP addresses are rarely ever changed and you are able to configure the telephone one time without the possibility of the IP address on the telephone changing thus avoid re-programming the router.
    - If DHCP is enabled, what is the scope (range) of the IP addresses the server is assigning?  
Example: 192.168.0.100 to 192.168.0.200. Make sure the static IP address selected for the telephone is not included in the DHCP scope.
3. **Home Router** IP address, user name, and password.
  - The private IP address of the router can be found by accessing a computer on the home network.
  - From Windows XP – go to **Start > Run** and from Windows Vista or Windows 7 – go to **Start > Search**.
    - Type **cmd** and **OK**.
    - Type **ipconfig** and press the **Enter key** on the keyboard.
    - The **Default Gateway** of the computer is almost always the private IP address for the router.
4. **Logical port** number for the telephone.
  - The logical port information must be obtained from the ECS database.

# Router Configuration

## Linksys® Router

A Linksys® BEFVP41 router is used for this example. Your router may vary slightly from this example.

**If programming the router from the LAN (customers PC), proceed to step #2**

### Step #1 – Turn-On Remote Administration

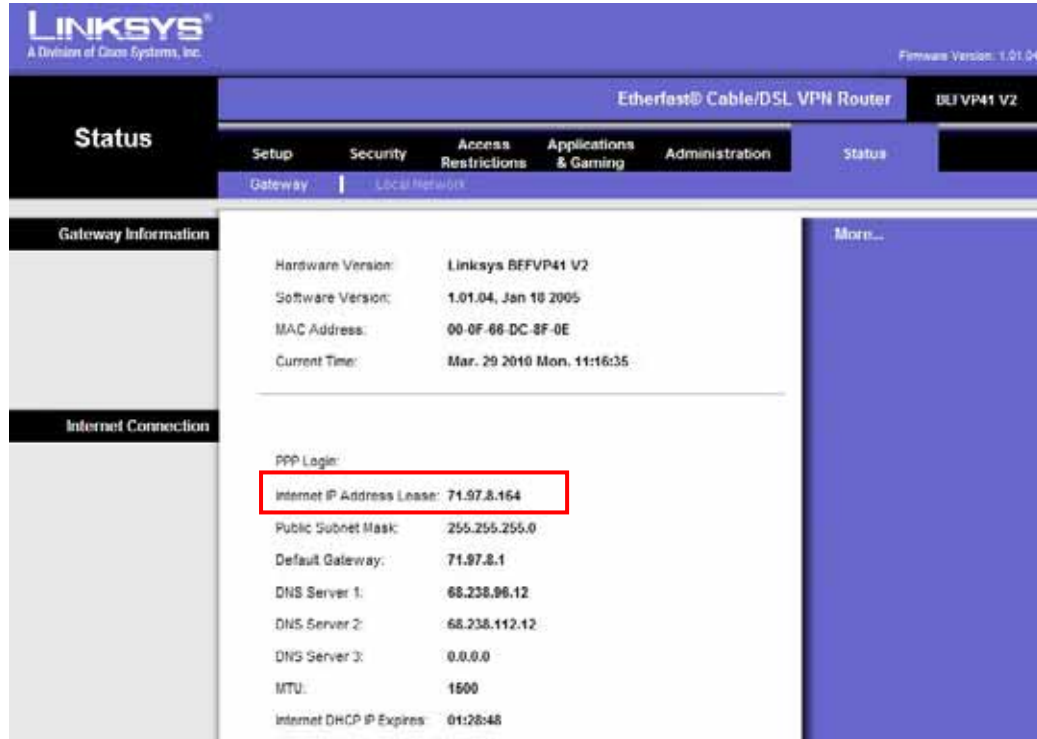
1. This step requires access to the router via the web client. To enable remote administration, you must first access the router from the LAN (customer) side.
2. Most routers have an option for remote programming. In default, remote programming is usually disabled.

**Note:** For security reasons, the default router password should be changed before allowing remote programming.

3. Log-in to the router
4. Select **Administration > Management** and select the **Enabled** radio button for **Remote Administration**. Press **Save Settings**.
5. Once **Remote Administration** is **Enabled**, you can access the router remotely using your web browser and **Administration Port 8080**.
  - Example: 71.97.8.164:8080.

The screenshot displays the Linksys web interface for an Etherfast® Cable/DSL VPN Router (BEFVP41 V2). The page title is "Administration" and the firmware version is 1.01.04. The navigation menu includes Setup, Security, Access Restrictions, Applications & Gaming, Administration, and Status. The "Administration" section is active, showing "Local Gateway Access" and "Remote Gateway Access" options. Under "Remote Gateway Access", the "Remote Administration" setting is set to "Enabled" (radio button selected) and the "Administration Port" is set to "8080". A red box highlights the "Remote Administration" and "Administration Port" fields. The "Save Settings" and "Cancel Changes" buttons are visible at the bottom.

- 6. If accessing remotely, you must identify the public IP address assigned to the WAN port of the router.
  - Select the **Status** tab and locate the **Internet IP Address Lease** (This is the public IP address):



## Step #2 – Configuration:

1. Access the router via the web programmer.
2. Determine the IP address scheme on the router as well as an IP address available for the telephone.
3. Select the **Setup** tab. Based on the configuration of the router, determine an IP address for the phone.

Example: The IP addresses shown are for example only.

- Router IP address (**Local IP Address**) = 10.10.100.250.
- DHCP Server Scope (**DHCP Address Range**) = 10.10.100.160-179.
- Find an IP address outside the range and assign it to the telephone. In this example, 10.10.100.180 is used. Make sure you program a default gateway and a subnet mask in the telephone.
  - IP addresses can NOT be duplicated. Be careful that the customer is not already using the IP address you select.

The screenshot displays the Linksys web interface for an Etherfast Cable/DSL VPN Router (BEFVP41 V2). The 'Setup' tab is selected, and the 'Local IP Address' is configured to 10.10.100.250 with a Subnet Mask of 255.255.255.0. The 'Local DHCP Server' is enabled, with a Start IP Address of 10.10.100.180 and a Number of Address of 20. The DHCP Address Range is 10.10.100.160 to 10.10.100.179. The Client Lease Time is set to 0 minutes (0 means one day).

### Step #3 – Port Forwarding for UDP Port 50002

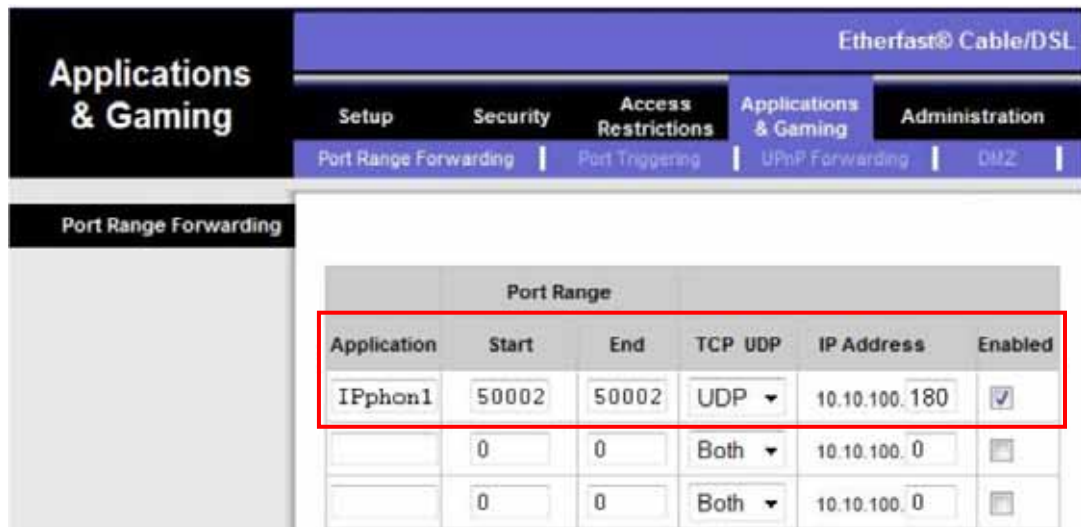
Port Forwarding for UDP Port 50002 provides audio to the telephone.

**Missing this step WILL result in NO RECEIVE AUDIO** to the telephone.

**Note:** You can use the DMZ option if port forwarding does not exist. Do not use Port Forwarding and DMZ options together.

1. Select the **Applications & Gaming > Port Range Forwarding** and enter the following information:
  - The port required for one IP telephone to be deployed is **UDP Port 50002**.
  - **Port 50002** is always used in remote locations with one IP telephone. If multiple telephones are used in the same remote location additional ports are required. This port is used to provide inbound audio to the telephone.
  - **Application** name: Enter **IPphon1**. This entry can be any name. It is only a reference.
  - **Start and End Port**: Enter **50002**. (RTP port (default) setting in telephone)
  - **TCP UDP**: Select **UDP** from the drop-down menu.
  - **IP Address**: Enter the **Static IP address** of the telephone.
  - **Enabled**: Check **Enabled**.
2. Press **Save Settings**.

**Important!** Port forwarding tables generally work from the top down. In most home routers there will not be any other entries. If there are other entries before the telephone, be sure they do not include UDP port 50002. If they do, our entry will not work.



## DMZ Option:

This option **MUST** be used if **Port Forwarding** is **NOT** available.

**Note:**

You can use the DMZ option if port forwarding does not exist. Do not use Port Forwarding and DMZ options together.

The DMZ option cannot be used when connecting multiple telephones. Only one device can be assigned in a DMZ when using SOHO routers.

1. Go to **Application & Gaming >DMZ** and set the **DMZ Host IP Address** to the static IP address of the telephone. Example: 10.10.10.180.
2. **DMZ**: Select **Enable** from the drop-down menu.
3. Press **Save Settings**.



- This concludes the configuration for the Linksys router.



# D-Link® Router

If programming the router from the LAN (customers PC), proceed to step #2.

## Step #1 – Turn-On Remote Administration

1. This step requires access to the router via the web client. To enable remote administration you must first access the router from the LAN (customer) side.

**Note:** For security reasons, the default router password should be changed before allowing it to be remote programmed. You will need the public (WAN) IP address if you plan to access the router remotely.

2. Go to **ADMIN > TOOLS** and select the **Enable Remote Management** check box then press **Save**.
3. When **Remote Management is enabled** you can access the router remotely using your web browser and port 8080.
  - Example: 71.97.16.17:8080.

<b>EBR-2310</b> //	<b>SETUP</b>	<b>ADVANCED</b>	<b>TOOLS</b>	<b>STATUS</b>
ADMIN	<b>ADMINISTRATOR SETTINGS :</b>			
TIME	There are two accounts that can access the router's management interface. These accounts are <b>admin</b> and <b>user</b> .			
SYSTEM	<b>Admin</b> has read/write access while <b>user</b> has read-only access.			
FIRMWARE	<b>User</b> can only view the settings but cannot make any changes.			
SYSTEM CHECK	Only the <b>admin</b> account has the ability to change both <b>admin</b> and <b>user</b> account passwords.			
	<input type="button" value="Save Settings"/> <input type="button" value="Don't Save Settings"/>			
	<b>ADMINISTRATOR (THE DEFAULT LOGIN NAME IS "ADMIN") :</b>			
	Login name : <input type="text" value="....."/>			
	New Password : <input type="text" value="....."/>			
	Confirm Password : <input type="text" value="....."/>			
	<b>USER (THE DEFAULT LOGIN NAME IS "USER") :</b>			
	Login name : <input type="text" value="...."/>			
	New Password : <input type="text" value="....."/>			
	Confirm Password : <input type="text" value="....."/>			
	<b>REMOTE MANAGEMENT :</b>			
	Enable Remote Management : <input checked="" type="checkbox"/>			
	IP Address : <input type="text" value="*"/>			
	Port : <input type="text" value="8080"/>			

4. If accessing the router remotely, locate the public IP address.
  - Select the **STATUS** tab and locate the **WAN > IP Address** (This is the public IP address):

The screenshot shows the web interface for an EBR-2310 router. The top navigation bar includes tabs for SETUP, ADVANCED, TOOLS, and STATUS (which is highlighted with a red box). On the left, there is a sidebar with links for DEVICE INFO, LOG, and STATS. The main content area is titled 'DEVICE INFORMATION' and contains the following details:

**DEVICE INFORMATION :**  
 All of your Internet and network connection details are displayed on this page. The firmware version is also displayed here.  
**Firmware Version: 1.05, 2 Aug 2006**

**LAN :**

MAC Address : 00-17-9a-4a-d5-33  
 IP Address : 192.168.0.1  
 Subnet Mask : 255.255.255.0  
 DHCP Server : Enabled

**WAN:** (highlighted with a red box)

MAC Address : 00-17-9a-4a-d5-34  
 DHCP Client Connected  
 Connection : DHCP Release | DHCP Renew  
**IP Address : 71.97.16.17** (highlighted with a red box)  
 Subnet Mask : 255.255.255.0  
 Default Gateway : 71.97.16.1  
 DNS : 4.2.2.2 4.2.2.1

## Step #2 – Configuration:

1. Access the router via the web programmer
2. Determine the IP address scheme on the router as well as an IP address available for the telephone.
3. Select the **SETUP** tab. Based on the configuration of the router, determine an IP address for the telephone.

Example: IP addresses shown are for example only.

- **Router IP address** (Local IP Address) = 192.168.0.1.
- **DHCP Address Range** = 192.168.0.100-199.
- Find an IP address outside the range and assign it to the telephone. In this example, 192.168.0.200 is used.
  - IP addresses can NOT be duplicated so be careful that the customer is not already using the IP address you select.

4. Press Save Settings.

The screenshot shows the configuration interface for an EBR-2310 router. The 'SETUP' tab is selected and highlighted with a red border. The interface is divided into several sections:

- NETWORK SETTINGS :** A green header section with instructions on configuring internal network settings and a built-in DHCP server. It includes 'Save Settings' and 'Don't Save Settings' buttons.
- ROUTER SETTINGS :** A dark grey header section with instructions on configuring the router's IP address. It contains input fields for 'Router IP Address' (192.168.0.1), 'Default Subnet Mask' (255.255.255.0), and 'Local Domain Name'. The 'Enable DNS Relay' checkbox is checked.
- DHCP SERVER SETTINGS :** A white header section with instructions on configuring the DHCP server. It includes a checked 'Enable DHCP Server' checkbox, a 'DHCP IP Address Range' field (100 to 199), and a 'DHCP Lease Time' field (180 minutes). The range and lease time fields are highlighted with a red border.
- DYNAMIC DHCP CLIENT LIST :** A table listing active DHCP clients.

Host Name	IP Address	MAC Address	Expired Time
ivn-e1892525512	192.168.0.100	00-07-e9-b5-5b-b1	Apr/01/2002 03:00:15

### Step #3 – Port forwarding for UDP port 50002

Port Forwarding for UDP Port 50002 provides audio to the telephone.

**Missing this step WILL result in NO RECEIVE AUDIO** to the telephone.

#### Note:

You can use the DMZ option if port forwarding does not exist. Do not use Port Forwarding and DMZ options together.

- Select the **ADVANCED** tab and then select **PORT FORWARDING** and enter the following information:
  - The port required for one IP telephone to be deployed is **UDP Port 50002**.
  - Port 50002** is always used in remote offices or homes with one IP telephone. If multiple telephones are used in the same remote location additional ports are required. This port is used to provide inbound audio to the telephone.
  - Name:** Enter **Ipkt-1** and select **Application Name** from the associated drop-down menu.
  - IP Address:** Enter the **Static IP address** of the telephone and select **Computer Name** from the associated drop-down menu.
  - Port Start** and **Port End:** Enter **50002** for both.
  - Traffic Type:** Select **UDP** from the drop-down menu.
  - Check the box** to the left of **Name** and **IP Address**.
- Press **Save Settings**.

EBR-2310 //	SETUP	ADVANCED	TOOLS	STATUS																								
PORT FORWARDING	<b>PORT FORWARDING RULES :</b> 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"/>																											
APPLICATION RULES	<b>10- PORT FORWARDING RULES</b>																											
NETWORK FILTER	<table border="1"> <thead> <tr> <th></th> <th>Name</th> <th>Application Name</th> <th>Port Start</th> <th>Port End</th> <th>Traffic Type</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/></td> <td>ipkt-1</td> <td>&lt;&lt; Application Name</td> <td>50002</td> <td>50002</td> <td>UDP</td> </tr> <tr> <td></td> <td>IP Address</td> <td>&lt;&lt; Computer Name</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>192.168.0.200</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					Name	Application Name	Port Start	Port End	Traffic Type	<input checked="" type="checkbox"/>	ipkt-1	<< Application Name	50002	50002	UDP		IP Address	<< Computer Name					192.168.0.200				
	Name	Application Name	Port Start	Port End	Traffic Type																							
<input checked="" type="checkbox"/>	ipkt-1	<< Application Name	50002	50002	UDP																							
	IP Address	<< Computer Name																										
	192.168.0.200																											
WEBSITE FILTER																												
FIREWALL SETTINGS																												
ADVANCED NETWORK																												

### DMZ Option

This option **MUST** be used if **Port Forwarding** is **NOT** available.

**Note:** You can use the DMZ option if port forwarding does not exist. Do not use Port Forwarding and DMZ options together.  
The DMZ option cannot be used when connecting multiple telephones. Only one device can be assigned in a DMZ when using SOHO routers.

1. Go to the **ADVANCED** tab and then select **FIREWALL SETTINGS** and enter the **DMZ IP Address** to the static IP address of the telephone.
2. **Enable** the **DMZ Host** option.
3. Press **Save Settings**.

EBR-2310 //	SETUP	ADVANCED	TOOLS	STATUS
PORT FORWARDING	<b>FIREWALL SETTINGS :</b>			
APPLICATION RULES	The Web Filter options allows you to set-up a list of allowed Web sites that can be used by multiple users. When Web Filter is enabled, all other Web sites not listed on this page will be blocked.			
NETWORK FILTER	<input type="button" value="Save Settings"/> <input type="button" value="Don't Save Settings"/>			
WEBSITE FILTER	<b>DMZ HOST :</b>			
FIREWALL SETTINGS	The DMZ (Demilitarized Zone) option provides you with an option to set a single computer on your network outside of the router. If you have a computer that cannot run Internet applications successfully from behind the router, then you can place the computer into the DMZ for unrestricted Internet access.			
ADVANCED NETWORK	<b>Note:</b> Putting a computer in the DMZ may expose that computer to a variety of security risks. Use of this option is only recommended as a last resort.			
	Enable DMZ Host : <input checked="" type="checkbox"/>			
	DMZ IP Address : <input type="text" value="192.168.0.200"/> <input style="margin-left: 10px;" type="button" value=" &lt;&lt; "/> <input style="margin-left: 10px;" type="text" value="Computer Name"/>			

- This concludes the configuration for the D-Link router.



# Troubleshooting Tips

## (The Primary Focus – Non VPN telephones)

1. If the phone does not boot up with display data:
  - Make sure the phone has a valid IP address, subnet mask and gateway address.
  - Verify LAN 2 on the ECS has a valid IP address, Subnet mask and Gateway address.
  - Make sure the telephone has a valid logical port programmed in the telephone.
  - Verify the TCP port translations on the ECS side have been made. (see EBA 2009-13)(TCP controls all display, lamping and key functions).
2. If the phone boots up and the display is functional with time and date, and you can make a call, but have no audio or 1 way audio:
  - First determine if they have 1 way audio or no audio.
    - **If no audio**, verify the MBU version in the ECS system also make sure the MBU card will go into make busy.
    - **If 1 way audio**, where the remote phones audio **is not** getting to the destination but, but audio is being heard at the phone
      - Verify the UDP port translation on the ECS side. Make sure the translation is going to the MBU card and not LAN 2.
    - **If 1 way audio**, where the remote phones audio **is** getting to the destination but, no audio is being heard at the phone
      - Check the MBU IP address, subnet mask and gateway address
      - Check the UDP port translations in the remote router.
      - Make sure the public IP address is programmed in the ECS under stations/IP Stations/Non-VPN IP address.
        - This is the public IP address of the main side router where the ECS is located.
      - Make sure the IP phone is programmed as a Non-VPN phone in the ECS system.

