

GAC-300 Wifi Dial Up Router

The GAC-300 is a 802.11n WiFi Router with an advanced V.92 standard phone modem to enable Wireless access to the Internet through a phone line. The router makes a dialup connection to the dial up Internet Service Provider (ISP) of your choice. It comes programmed with a free dial up ISP phone number so that you can test the router before programming it with your ISP's access number. The included V.92 standard 56K modem connects through the router's USB port and provides the maximum data rate a phone line can support (usually 40-50 kbps for a clear phone line, less for noisy lines). The GAC-300 is compatible with all WiFi devices (Windows and Mac Laptops, iPad, iPhone, Android Phones, etc.).

Specifications

Wireless Standards	IEEE 802.11n, IEEE 802.11g, IEEE 802.11b
Wireless Signal Rates	11n: Up to 150 Mbps
Frequency Range	2.4-2.4835GHz
Wireless Transmit Power (MAX)	20dBm(Max. EIRP)
Interface	1 10/100M LAN Port,1 USB 2.0 Port
Phone Modem	V.92 Standard.
DC Supply	5v/1A from USB charger (not included)
Operating/Storage temperature	5°C~40°C/0°C~60°C
Relative/Storage humidity	5% ~ 90%, Non-Condensing
Certifications	FCC, CE, RoHS



Figure 1 Top view of the GAC-300 showing the connections for the modem and power

Making the First Connection

Start by unpacking the router. The package consists of :

(a) Router, (b) USB Phone-Modem, (c) USB Cable which fits into any USB power adapter with minimum 1A output (USB DC adapter not included) (d) Phone cable, (e) Printed User Guide

Attach the phone cable to the RJ-11 slot on the black phone modem and the other end of the phone cable to a telephone wall jack. Connect the phone modem to the USB port on the router. Connect your USB charger to the power input of the router or use the included USB cable to connect to the USB jack on your power adapter. The router will power up and the router will dial-out to the pre-configured free ISP Internet using the default long distance phone number configured in the router. **Per minute long distance charges from your phone company may apply and to avoid those charges, configure a local access number and described in the Configuration section.**

The power up and dial out process takes anywhere from 2 to 3 minutes depending on the quality of your phone line and the ISP you are dialing. Once the connection is established, the INTERNET LED with a "Globe" logo will start flashing about once per second. If the LED does not flash, power off the router, wait for 5 seconds and put the power back on. Consult the Troubleshooting Section in this guide if the Internet LED still does not start flashing after 3 minutes.

Turn on your PC and scan for wireless networks. The router WiFi ID - **OpenWrt** will appear. Select **OpenWrt** and click Connect. If **OpenWrt** does not appear then wait for 10 seconds, and re-scan. Open a web browser on the PC (Internet Explorer for example) and see if you can access websites on the Internet. If the INTERNET LED is blinking but you cannot connect to the Internet then your PC may not be connected properly to the router. Refer to the Troubleshooting section for help. Once you are done with the Internet session, turn off the power to disconnect the connection. **The default phone number configured in the router is a long distance number and you may incur long distance charges for this first connection.** You should now go ahead and customize the router with the phone number and account information for your own ISP account and optionally configure WiFi security. If you want to use the router in wired mode, connect the PC's LAN port with a LAN cable (not supplied) to the LAN port on the router. Make sure that the PC is configured to get an IP address automatically. This is usually the default for a PC.

Configure the Router

Connect via WiFi to the **OpenWrt** ID as described earlier. Open up your web browser and enter the address <http://192.168.1.1> in the address bar. This is the internal web configuration page on the router and not a web site on the Internet. The login screen will appear. Login to the router with user name **root** and password **admin**. Click the **Network** tab to open up the **Interfaces** page where the **DIALUP** interface shows the status of the dial up connection (Figure 3). Next click the **DIALUP** tab under **Interfaces** and the Dial Up configuration page will appear as shown in Figure 4 below. Only a few entries on this page need to be changed. Set the Username and Password to that of your Dial Up ISP Account and specify the ISP access phone number. Press **Save & Apply**. The router will store the new entries and bring the interfaces up. Wait ten seconds and power cycle the router. The router will power up and automatically dial the configured number. Once the connection is established, the INTERNET LED in front will start flashing continuously once per second. If the INTERNET LED does not flash, power off the router, wait for 5 seconds and put the power back. The INTERNET LED will begin to flash once per second after the connection is made (after about 2 minutes) and you can start accessing the Internet. If the INTERNET LED does not flash continuously, click the Status Tab on the top most row of the web page and then click the Dialup option on the extreme right of the Status Page. The first line of the log will provide the current status of the dial up connection. Consult the Troubleshooting section at the end of this guide to diagnose the issue.

Start/Stop Connection Remotely

The dial up connection can be started and stopped remotely by accessing the web interface of the router. Refer to Figure 3 and identify the 2 green arrows icon at the far right of the dialup interface line. Click the icon to start the dial up connection. To close the connection- click the red icon right next to the 2 green arrows icon. If the connection does not close you may need to click that red icon again. Do not click the red-X icon at the far right since that will completely delete dial up interface. If you click that by mistake, then you will have to restore the router to factory defaults to recover the dial up functionality. Note that there is known bug that sometimes the Internet LED continues to blink even after the connection is closed using this method.

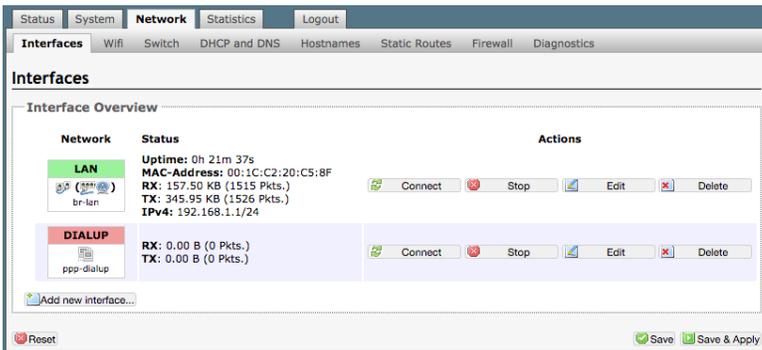


Figure 3 Interface Status Page

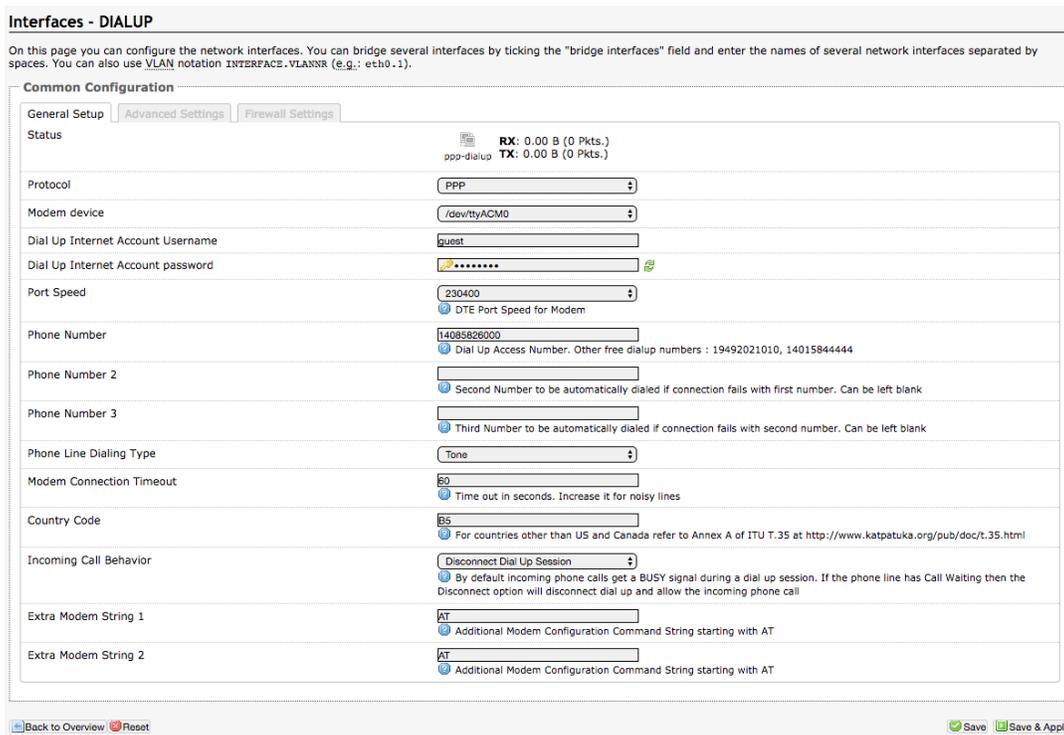


Figure 4 Dial Up Configuration Page

Remote control of the router connection can be performed by external applications by using a simple API which sends a clear ASCII command string to TCP port 9094 of the router. The 3 commands supported are:

```
CONNECT<Carriage Return>      /* Opens dial up connection */
STATUS<Carriage Return>       /* Reports status of connection */
DISCONNECT<Carriage Return>    /* Closes dial up connection */
```

The API can be tested by connecting a PC to the router with WiFi (SSID OpenWrt) or Ethernet and typing the telnet command on the PC.
telnet 192.168.1.1 9094
CONNECT <ret>

Optional Configuration Menu Items

In rare cases you may need to change some fields on the Common Configuration Page. Select pulse dialing if your phone line is still set to the old pulse method of dialing. Change the modem country code if you are using the router outside USA/Canada so that modem can recognize the dial tone on the line. A list of country codes can be found on the web at <http://www.katpatuka.org/pub/doc/t.35.html>. If your phone line is old or noisy, it may take a little longer to connect to your ISP. In that case, increase the Modem Connection Timeout to more than 60 seconds. If call waiting service is available on your phone line you can set the router to either ignore call waiting during a data connection (callers get a busy tone) or to drop the data connection and allow the incoming call. Press *Save & Apply* to save any changes.

Automatic Mode

Access the last field in the Dial Up Configuration page to configure the router to dial up on demand at power up. In this mode, whenever your PC is connected to the router (via WiFi or LAN) and you attempt to access the Internet, the router will make the dial up connection. Enter the time after which the router should automatically disconnect the connection in case of no activity (180 seconds is recommended). Setting the time to 0 changes the router from Automatic Mode to Forced Connect at power-up. Press *Save & Apply* to save the new configuration. In Automatic mode various programs on your laptop (Virus update, Windows Update, etc.) may attempt to access the Internet without your knowledge and will trigger a dial up connection. Once you are connected to the Internet, you will not be able to receive any calls on your phone line. The dial up connection can be disconnected by disconnecting the WiFi connection on your laptop/device. The dial up connection will be automatically dropped in 3 minutes or less (Automatic Disconnect Parameter in the Dial Up Configuration webpage). As a further precaution, you can use a power strip to switch the power off to the router when it is not being used.

Optional: WiFi Security (Recommended)

Your WiFi connection can optionally be made secure if you want to be sure that no one else accesses the Internet using your dial up connection or accesses your PC over WiFi. Click the **WiFi** tab (located next to the **Interfaces** tab) under the Network section. In the Wireless Overview section, there are clickable options on the extreme right. Click the “pencil” image to edit the WiFi configuration (Figure 5). Click the Wireless Security tab in the lower section to set encryption. The most secure form of encryption is WPA2-PSK and the key can be a mixture of characters and letters. If your device does not support WPA2-PSK, you can set the encryption to WEP. However, in the case of WEP, the key has to be exactly 10 characters. After making the entries, click *Save & Apply*.

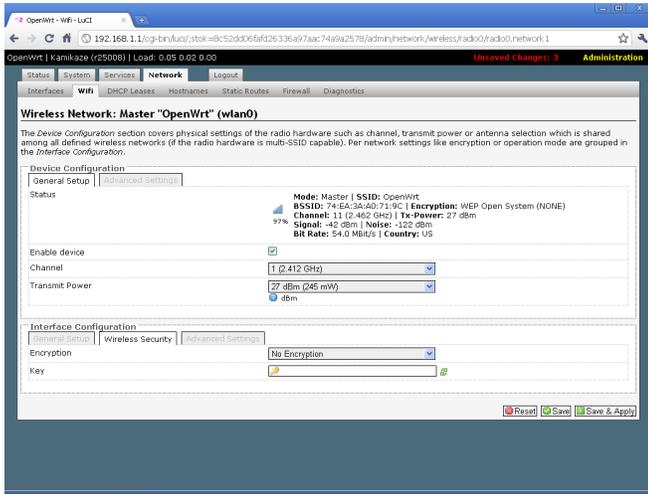


Figure 5 WiFi Configuration Page

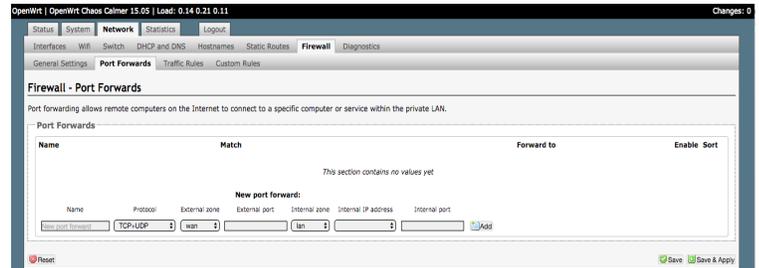


Figure 6 Port Forwarding (Traffic Redirection Page)

Optional: Router Password Change

For increased security, you can change the password for the router. Select **System** and then **Administration**. Put in the new password, confirm it and click *Save & Apply*.

Optional: Scheduled Dial Up

The router can be configured to make a dial up connection at particular times of the day, week, or month and the duration of the connection can also be specified. In order to create a schedule, first set the TimeZone by clicking on the System Tab, selecting the city in the same time zone as you desire and then clicking *Save & Apply*. Next, click on the Services Tab and then on Scheduled Tasks. Type in the scheduled dialup command (crontab) in the box (see examples below) and then click Submit. After that turn the power off and then on to the router to enable the schedule. Note that the router does not have a real-time clock and gets set with the correct time only after it connects to the Internet after power on. So if power is lost then the router will reset to the factory set time and the configured schedule will be affected till the router dials up for the first time.

A crontab file has five fields for specifying the schedule:

```
* * * * * command to be executed
- - - - -
| | | | |
| | | | | +---- day of week (0 - 6) (Sunday=0)
| | | | | +----- month (1 - 12)
| | | | | +----- day of month (1 - 31)
| | | | | +----- hour (0 - 23)
+----- min (0 - 59)
```

* means all values (i.e all days or all months, etc.); ? means omit the specification
For scheduled dial up, the command is “ifup dialup” to start the connection and “ifdown dialup” to end the connection.

To start the session at 1:00 AM and end it at 1:05 AM every day enter the following 2 lines in the Scheduled Tasks box and Submit:

```
0 1 * * * ifup dialup
5 1 * * * ifdown dialup
```

To start the session at 5:30 AM every Sunday and end it 5 minutes later, use the following commands:

```
30 5 ? * 0 ifup dialup
35 5 ? * 0 ifdown dialup
```

Port Forwarding (Redirection)

Port Forwarding can be used to redirect incoming connections to servers on the LAN side of the GAC router. Port Forwarding is useful if video cameras and other devices on the LAN need to be accessed from the Internet, say through a scheduled dial up connection. Typically, a dynamic DNS client on the content server is used to associate a hostname with the current IP address of the GAC router site. The port forwarding configuration on the router then ensures that those incoming connections are redirected to the content server. To configure port forwarding, click the **Network/Firewall** tab and then select the **Port Forwards** section of the firewall page. The port forwarding page shown in Figure 6 will be displayed.

Select the incoming protocols (TCP, UDP, TCP and UDP or custom IP protocol name), the ports, and the IP address of the server on the LAN (Internal IP address) that the traffic is to be redirected to. For example, for a web server on the LAN, the protocol is TCP and with port being 80. Press *Add* and then *Save & Apply* to save the changes.

Compatible ISPs

Most dialup ISPs are compatible with Linux and the GAC-300 even though they may state that they do not offer customer support for Linux. Exceptions are NetZero/Juno and AOL who rely on special dialer software and are incompatible. In general, the highest speed will be achieved with ISPs who support V.92 access. The ISPs who are known to work are: Copper.net, Toast.net, Socalfree.net, CenturyTel.net, Sympatico.ca, Delmarva Online, AT&T, MSN, Telus(Canada), and PeoplePC.

Troubleshooting

I can't get connected to the Router

First make sure that the WiFi connection to the router at IP address 192.168.1.1 is established. To verify, type the command *ping 192.168.1.1* on your PC. Lack of a response indicates that the WiFi connection is not made and you may have to rescan for networks and reconnect to OpenWrt. If you can't make the WiFi connection, connect your PC via the LAN connection to the router and try the ping test again.

The Internet LED (Globe) does not start flashing 2-3 minutes after power up

This indicates there is a problem in connecting to your ISP. Ensure that the black modem is connected to the USB port of the router and that the modem is connected to the phone line. Make sure that no one else is using the phone when you dial up. Also configure some other ISP access phone number in case the original number is busy. In many cases, you will have to look at the Dialup Status Screen to diagnose further. Click *Status* and then click the *Dialup* option on the upper right. The page displays the status of the connection such as "No Dialtone", "Waiting to Connect", or "Modem connected to far end - Doing Password Authentication". If PPP authentication fails, check the ISP account user name and password. For further assistance, select the lines on the web page and Copy/Paste it into an Email to: *support@greatarbor.com* using normal PC commands (On Windows, you can use Cntrl-A for Select All, Cntrl-C for Copy, and Cntrl-V for Paste). Also send the router configuration as an attachment to the support email. The router configuration is obtained by clicking *System*, and then clicking *Backup/Flash Firmware*. Select *Generate archive* to create a file which can be attached to the email.

I made some changes to the router and it doesn't work any more

Use the *Reset to defaults* option in the *Backup/Flash Firmware* page to go back to the factory configuration. Another way to reset to defaults is to press the reset button for 8 seconds. All the LEDs will go off and then the SYS LED (next to the PWR LED) will start blinking. The restored factory configuration will come back up in 2-3 minutes and the SYS LED will be solid green. All your changes will be wiped out so configure the dial up account again as discussed earlier.

Speeds are very low

Dialup speeds depend on the condition of your phone line and the modem configuration of your ISP. It is normal to get download speeds of 40 kbps and upload speeds of 30 kbps.

Can't receive phone calls

Once you are connected to the Internet, you will not be able to receive any calls on your phone line. To prevent this, make sure to disconnect after the dial up session or power off the router. You can also select the option to drop the dial up connection in case of an incoming call (see Figure 4).

Troubleshooting Table

Symptom	Next Steps
Factory configured ISP is not accessible even after waiting a few minutes after power up	Make sure the phone cable is plugged in and Tone/Pulse Dial is set correctly and the line is not busy. After unsuccessful call, copy System Log and router backup file into an email to support
Your configured dial up access number does not work	Make sure that your ISP access phone number is correct (do you need to put in the area code ?) - try dialing the number with a regular phone, and if you hear beeps and tones the number is correct. Check user name and password for ISP account. Send System Log and router backup file to support.
Cannot connect to router	Make sure your PC WiFi is enabled and you see the OpenWrt network.

Warranty

Great Arbor Communications warrants this product against defect in materials and workmanship for 1 year after purchase of the unit. Products requiring warranty service should be returned to Great Arbor in original packaging after receipt of a RMA Number. Any product replaced by Great Arbor shall retain a warranty for the remaining warranty period.

Warranty Exceptions

- Any defect caused by misuse, improper installation or maintenance that is not required as per the instructions; Any unauthorized disassembly and repair;
- Any defect caused by improper use in the working conditions beyond the stated ones by the instruction (for example: use under abnormal temperatures that are too high, low, wet or dry; high sea-level; unstable electric current and voltage and so on)
- Any defect caused by personal disaster or improper maintenance, such as mechanical damage, serious oxidation and rusting, rat damage, permeating exertion and so on;
- Any defect caused by transportation or loading during return shipment;
- Any damage caused by natural disasters such as earthquake, fire, flood, lightning strike, or any other natural occurrence;
- Any other defects that are not caused by workmanship, technique, product quality and the like.

Notices:

- Warranty service stated above is only valid for products sold in the continental USA and Canada.
- As for any direct or indirect loss caused by abnormal use of the product, Great Arbor shall only be liable for the duties that are stipulated by relevant state law.
- Great Arbor shall neither, on any account, respond to any loss or damages caused by intangible property such as applications or configurations, nor respond to any accusation put forward by a third party.
- Great Arbor reserves all rights including interpretation and modification to this warranty policy.
- Great Arbor shall not be liable for long distance charges or incur any liability for inadvertent dial up due to malfunctioning of the unit or user

To prevent unintended dial up, power off the router after use. Great Arbor Communications disclaims all responsibility for inadvertent dial up due to software/hardware malfunction or user configuration.