



ACR-201-G

802.11g Wireless Ethernet Bridge Station

Technical Manual



www.otcwireless.com



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Wireless Ethernet Bridge Station
Technical Manual
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Chapter 1 Introduction

ACR-201-G is an IEEE 802.11g compliant wireless Ethernet Bridge Station, with a 100/10 -BaseT interface.

What separates the ACR-201-G from many other 802.11g-compliant radios is that its 100/10-BaseT interface affords a true plug-and-play feature. This is unavailable from other 802.11g Station radios that are based on either a PCMCIA or a USB interface. They require the installation of a driver on the host device. The ACR-201-G driver-free feature also means that the operation of the radio is OS (operating system) independent.

The driver-free feature enables wireless connectivity for any computing devices/systems with any OS (operating system), as long as the device has an Ethernet communication port available. Ethernet-equipped workstations in a corporate environment, for example, benefit greatly from this driver-less feature because the IT workforce has one less driver to worry when upgrading an OS or when salvaging an OS crash. Special computing/networking devices, such as printer servers, POS (point of sales) machines may not even have an easy way of installing a driver for a radio. In addition to supporting the connection of a single computer or device to an 802.11g Access Point in a pure 802.11g Station role, ACR-201-G also supports the IP-Bridging Mode, where multiple computers can share the wireless access to an 802.11g AP through a single ACR-201-G Station radio.

A built-in Web-based Utility program is provided for the users to configure ACR-201-G. This Utility program can also be used to monitor the communication condition when the radio is in operation. Once configured, the radio runs self-sufficiently without the aid of any driver program in the device connected to the radio. This Web-based Utility program therefore is intended to be, in most cases, just a tool for the network operators. An end user simply plugs the pre-configured radio into any device equipped with a RJ-45 receptacle without ever being exposed to this Utility program. The details are described in chapter 3.

ACR-201-G supports the WPA (Wi-Fi Protected Access) -TKIP (Temporal Key Integrity Protocol) and WPA-PSK (Pre-shared Key) security protocol in addition to the standard 64 and 128-bit WEP encryption to provide the highest degree of security to your wireless network.

ACR-201-G has a compact form-factor that blends easily into a home/office environment. It also lends particularly well to portable applications. The specifications are given on the next page.

ACR-201-G Radio

Key Features

- Plug & Play —
 - No driver on the host device is required for radio operation
 - Radio operation is independent of the operating system on computer or any connecting device (Windows 98/2000/ME/XP, MAC, Linux, Unix, embedded, etc.), as long as the device has a properly supported Ethernet port.
- Industry standard IEEE 802.11g-compliant wireless interface; Interoperable with AP and Client radios from other vendors
- WPA (Wi-Fi Protected Access) – TKIP (Temporal Key Integrity Protocol) and WPA – PSK (Pre-shared Key) security in addition to the 64 and 128-bit WEP encryption for highest degree of security
- The IP Bridging Mode, when enabled, allows the sharing of the Station Radio by multiple computers
- Ethernet (802.3 compliant) host interface to enable true Plug & Play
- Maximum 54 Mbps data rate and automatic selection of lower data rates in degraded RF environment
- Integrated omni-directional-antenna to provide best tradeoff between link-quality and mobility
- Remote network management achievable through Web browser-based configuration tool run from any OS platforms
- Remote firmware/software upgrade can be achievable from any OS platforms

Specifications

Model	ACR-201-G
Standard	IEEE 802.11, 802.11g, WPA-TKIP, WPA-PSK
Host Interface	Ethernet, 802.3, RJ-45 receptacle
Frequency	2.4 – 2.4835 GHz (US and Europe) 2.4 – 2.497 GHz (Japan)
RF Channels	11 channels (US, Canada, Brazil, Australia, New Zealand) 13 channels (Europe, except France) 4 channels (France, Mexico)
Transmission power	14 dBm at antenna input typical for 802.11g 16.2 dBm at antenna input typical for 802.11b
Receiver sensitivity	-65dBm @ 54Mbps, -80dBm @ 11Mbps at 1e-5 BER typical
Antenna	Dipole antenna with ~2dBi gain
Data Rate	1/ 2/ 5.5/ 6/ 9/ 11/ 12/ 18/ 24/ 36/ 48/ 54 Mbps
Modulation	OFDM with BPSK, QPSK, 16QAM, 64QAM (11g) DBPSK, DQPSK, CCK (11b)
Link Distance	~1200 ft in open space
Network Types	Support both the ad hoc mode and the infrastructure mode
Data Encryption	Support WPA-TKIP, WPA-PSK and 128/64-bit WEP
DC Supply	USB power cable (or an optional DC adapter with 5V DC)
Current consumption	<650mA (max. reached in transmit-mode)
LED Indicators	4: Power, Transmission, Receiving, Link/Ethernet-connection
Operating Temperature	-10°C – +60°C
Regulatory Compliance	<u>Safety</u> UL 1950, 3 rd edition CSA-C22.2 No. 950-95, 3 rd edition IEC60950, 2 nd edition, 1991+A1, 1992+A2, 1993+A3, 1995+A4, 1996 EN 60950, 2000 <u>Health</u> ETSI EN 50371, 2002 <u>EMC/Wireless</u> FCC Part 15, Class B FCC 15.247 RSS-210 ETSI EN 300 328-2, V 1.2.1 ETSI EN 301 489-17, V 1.1.1 (9-2000)

Chapter 2 Installation

Safety Statements

Use only the power adapter provided with this product or the manufacturer's authorized replacement power supply. Refer service or repairs, other than those described in the user documentation, to a professional service person.

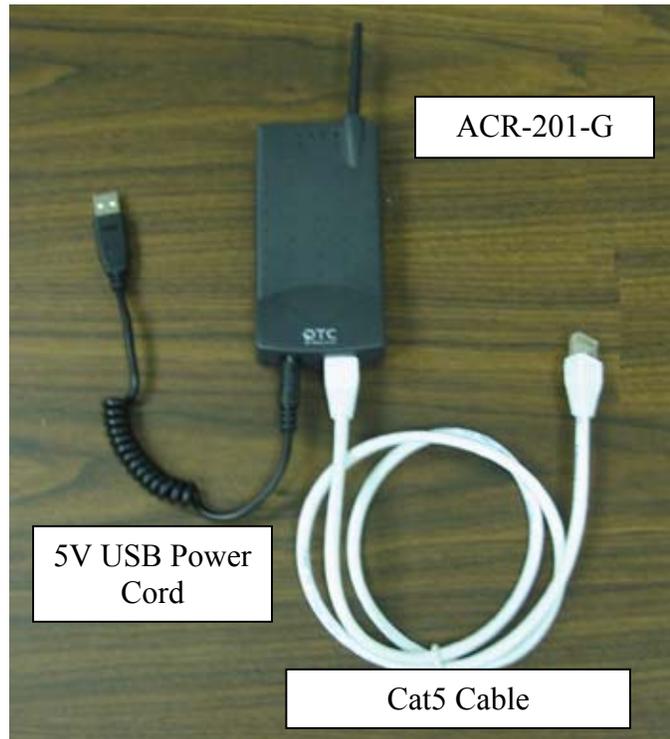
Installing the Hardware

Power

Power is supplied to the radio via the included USB power cord which is plugged into a compliant USB-host port. An optional DC adapter can be purchased from OTC Wireless, Inc.

Ethernet Connection

The ACR-201-G is to be connected to any device's Ethernet port via the included UTP cables. Use the white straight-through cat 5 cable to connect the ACR-201-G to a computer or a router's Ethernet port. If the **IP Bridging** feature is enabled (see Chapter 3 for details), to allow multiple devices to use the ACR-201-G for access via a hub or a switch, then use the *blue* crossover UTP cable to connect the ACR-201-G to the switch or hub..



Status LED's

Connect the 100/10-BaseT port (which resembles an over-sized telephone jack) on the ACR-201-G to the 100/10-BaseT port of the computer (or network device, such as a hub or switch). Power on the ACR-201-G, the LED's on the front panel should exhibit the following patterns:

<i>LED</i>	<i>Color</i>	<i>Light Pattern</i>
ON	Red	Steady ON
RX	Green	Steady ON
TX	Red	Blinking ON, when transmitting 802.11 signal
LINK	Yellow	Blinking ON, when communicating over the Ethernet port Steady Off, when Ethernet connection is not present.

If the yellow LED stays off, then the Ethernet connection to the Ethernet port is not made. Check your UTP cable and make sure that a straight-through cable is used for connecting it to a host computer and that a crossover cable is used for connecting it to a hub or switch. If one cannot communicate and the yellow LED is on, you may want to re-position the ACR-201-G to a different location for better RF reception. You may also want to check if the unit is configured with the proper RF channel and security settings by using the Web-based Utility software. Refer to Chapter 3 for instructions on how to change the RF channel and security settings.

For laptop users, once the ACR-201-G radio unit works properly, the unit can be secured at the top of the laptop LCD display by the provided radio clip as shown in the following figure.



Example of Typical Installation for ACR-201-G

System Requirements for Web-based Utility program

A Web-based Configuration Utility is built-in to the ACR-201-G for changing the configuration settings. For using the ACR-201-G Web-based Configuration Utility, your computer must meet the following requirements:

- (1) A Web browser must be installed on the computer. The supported Web browsers include Internet Explorer 5.0 and above, Netscape 6.0 and above, Mozilla 1.0 and above. ***JavaScript for the browser must be enabled.***
- (2) Ethernet capable computer with RJ-45 port (either built-in or add-on NIC).

No installation of any program is needed. See Chapter 3 for detailed information of configuring the Wireless bridge station. In order to configure the adapter, you need to know the factory default settings.

The factory default settings are:

IP address:	169.254.98.200
Subnet mask:	255.255.0.0
(Optional) Gateway:	169.254.1.1

User name: admin
Password: public

Chapter 3 Web-Based Utility Software

Use the Web-Based Utility Program

Once the ACR-201-G is properly powered up and connected to a computer running a Web browser on the same IP subnet, the Web-based Utility is ready for use. To access the web utility, open a Web browser and enter http:// followed by the current IP address of the ACR-201-G in the location field, for instance http://169.254.98.200

For configuring your computer to match the IP subnet of your PC to that of the ACR-201-G radio, different steps must be taken on different operating systems. Typically, a static IP address must be manually assigned to a computer and the user must have administrative privilege to perform such operation. Here are sample configuration steps involved on Windows and Macintosh.

On Windows, select “Start->Settings->Control Panel” and double click “Network and Dial-up Connections” icon. In the popped up window, right-click “Local Area Connection” icon and select the “Properties” command. In the “Local Area Connection Properties” dialog, choose “Internet Protocol (TCP/IP)” component in the “Components checked are used by this connection” section and then click the “Properties” button. In the subsequently popped up “Internet Protocol (TCP/IP) Properties” dialog, turn on “Use the following IP address” radio button, and enter the IP address, subnet mask as well other information in the related fields for your computer.

On Macintosh, select “Apple->System Preferences...” and double click the “Network” icon. In the popped up “Network” dialog, choose “Built-in Ethernet” option for “Shows” dropdown menu and select the “TCP/IP” tab. Choose “Manually” for the “Configure” dropdown menu, and then enter your IP address, subnet mask as well as other information in the related fields for your computer.

Overview of the Web Pages

With most browsers, there are six web pages accessible through six tab links. These web pages are hosted by a built-in web server in the ACR-201-G radio. Details of each Web page will be discussed in the following sections. The web pages may look different; however, functions are the same depending on the combination of operating systems and the web browser being used.

To access any hosted page, you are prompted for a user name and a password. When accessing a hosted page for the first time, use the factory default settings listed on the previous page.

The “Save” and “Cancel” buttons are common on “Admin”, “Wireless”, “Security”, and “Advanced” pages. Clicking the “Save” will apply the settings according to the displayed value in that particular web page. You will be prompted to restart the ACR-201-G unit. Please note that you may have to manually click “Refresh” or “Reload” button of the web browser in order to see the updated web page due to the caching mechanism of the web browser. Alternatively, the user can change

the setting of the internet browser such that the browser would retrieve new web pages instead of displaying the cached web pages.

Admin

The “Admin” page (Figure 1) is the default home page for the built-in web server. On this page, users are able to change settings, which are used for administration purposes. The web page is divided into four sections: Device Name, IP settings, Security, Commands and Upgrade Firmware.

1. Device Name:

Device Name

This is the name that the bridge will use to identify itself to external configuration and IP-address-finding programs. This is not the same as the SSID. It is okay to leave this blank if you are not using these programs.

2. IP Settings:

IP Address Mode

Select 'DHCP' to get the IP settings from a DHCP server on your network. Select 'Static' to use the IP settings specified on this page.

IP address

The IP address of this ACR-201-G wireless bridge station. This allows the user to set a static IP address to the Wireless bridge station. This IP address is only used for accessing the built-in Web server. In order to access the Web server, the computer must use an IP address on the same subnet of the wireless bridge station. *It is not necessary to change this IP address to an address used by the Wireless Network, but it is okay to do so, if desired. However, if you do so, please consult with your system or network administrator to obtain an IP address.*

WARNING: Any changes to the IP settings should be contemplated carefully, documented well, and made only after consulting your system or network administrator. Failure to do so may result in being unable to access the built-in Web server and/or may affect network operation.

Subnet mask

The subnet mask specifies the network number portion of an IP address. The factory default is 255.255.0.0. This allows the user to set the subnet mask. *If you change the IP address to one that is usable in your network, you may need to change this setting also.* Please ask your system or network administrator for the correct subnet mask.

Gateway

This is the IP address of the gateway that connects you to the Internet. Allows the user to set the default gateway. *If you change the IP address to one that is usable in your network, you may need to change this setting*

a/so. Please ask your system or network administrator for the correct gateway.

Device Name	<p>Device Name: <input type="text" value="ACR201-G Bridge"/></p> <p>This is the name that the bridge will use to identify itself to external configuration and IP-address-finding programs. This is not the same as the SSID. It is okay to leave this blank if you are not using these programs.</p>
IP Settings	<p>IP Address Mode: <input checked="" type="radio"/> Static <input type="radio"/> DHCP</p> <p>Select 'DHCP' to get the IP settings from a DHCP server on your network. Select 'Static' to use the IP settings specified on this page.</p> <p>IP Address: <input type="text" value="169.254.98.200"/></p> <p>Enter the IP address of the bridge</p> <p>Subnet Mask: <input type="text" value="255.255.0.0"/></p> <p>The subnet mask specifies the network number portion of an IP address.</p> <p>Default Gateway: <input type="text" value="169.254.1.1"/></p> <p>This is the IP address of the gateway that connects you to the internet.</p>
Security	<p>User Name: <input type="text" value="admin"/></p> <p>This is the user name that you must type when logging in to these web pages.</p> <p>Administrator Password: <input type="password" value="*****"/></p> <p><input type="password" value="*****"/></p> <p>This is the password that you must type when logging in to these web pages. You must enter the same password into both boxes, for confirmation</p> <p style="text-align: right;"><input type="button" value="Save"/> <input type="button" value="Cancel"/></p>
Commands	<p>Reboot Bridge: <input type="button" value="Reboot"/></p> <p>Reset to Factory Defaults: <input type="button" value="Reset"/></p>
Upgrade Firmware	<p>File to upload:</p> <p><input type="text"/> <input type="button" value="Browse..."/></p> <p><input type="button" value="Upload"/></p> <p>The upload may take up to 60 seconds.</p>

Figure 1. "Admin" Web Page

3. Security

User Name

This is the user name that you must type when logging in to these web pages.

Password

This is the password that you must type when logging in to these web pages. You must enter the same password into both boxes, for confirmation. The built-in Web server will verify the login name and password before giving access to the hosted pages. Each time the user name or password is changed, the Web server will prompt the user for the new user name and password.

4. Commands

Reboot bridge

Press this button to reboot the wireless bridge station. You will need to reboot the unit after most of the changes you make.

[Reset to factory defaults](#)

Press this button to reset to factory default. This button allows the user to reset **all** the settings to the factory defaults (not just the fields on this Admin page!). Please be careful: once reset is completed, the current settings are all over-written. There is no way to get back to your current settings unless you remember them or keep an adapter settings copy. It is always a good idea to keep a copy of the current setting before you change the current settings.

5. Upgrade Firmware

This allows the user to upgrade the firmware for ACR 201-G. Click on browse to select the correct firmware then click on upload to complete the upgrade.

Info

The Info Page (Figure 2) shows all the current setting of the radio. There are three subsections in this web page: Access Point Information, Bridge Information, and Available Access Points.

OTC WIRELESS **ACR-201-G Web Management Utility**

Admin Info Template Wireless Security Advanced

Information
Basic information about this bridge. NOTE: You may have to reload this page to see the current settings.

Access Point Information

State: Associated
Wireless network name (SSID): ASR-102-G
Channel: 1
Transmission rate: Best (automatic)
Communication strength: 76%
BSSID: 0060B313990C
WEP: disabled

Bridge Information

Bridge Name: ACR201-G
IP address: 169.254.98.200
MAC address: 0060B313990E
Radio firmware version: 1.0.4.3
ACR firmware version: 3.00

Available access points

SSID	BSSID	Channel	Strength	Mode
ASR-102-G	0060B313990C	1	76%	802.11g
SPY	0060B31398CA	1	65%	802.11g
NETGEAR	0060B313994F	2	65%	802.11g
WJJET0001	0290E0A6BAC4	1	70%	802.11b
WJJET0008	0290EA504E14	7	75%	802.11b
PSetherwire	0003DE270043	11	76%	802.11b

Figure 2 “Info” Web Page

1. Access Point Information:

This section displays the information of the wireless connectivity status of ACR-201-G. Each field is described below.

[State](#)

The connection/ association status of the wireless port

[Wireless Network Name \(SSID\)](#)

Shows the SSID of the associated AP. To change, see “Wireless Configuration” Tab → “Wireless Network Name (SSID)”.

[Channel](#)

Shows the current RF channel that this wireless bridge station is operating on. To change channel, see “Wireless Configuration” Tab → “Channel”.

[Transmission Rate](#)

The transmission rate established with the access point if in infrastructure mode or with a station if in ad-hoc mode.

[Communication Strength](#)

The indicator of RF communication signal strength.

[BSSID](#)

Network Identifier for basic service set

[WEP](#)

Shows if WEP encryption is enabled or not. To enable/disable/change WEP settings, see “security” tab → WEP.

2. Bridge Information:

This section displays basic information of the ACR-201-G unit

[Bridge Name](#)

Name of the ACR-201-G device

[IP Address](#)

IP Address of this ACR-201-G unit. To manually change the IP Address or let the Access Point obtain an IP Address from a DHCP Server automatically, see “IP Addr” in IP Settings under Admin tab..

[MAC Address](#)

This is the MAC Address of this ACR-201-G unit. It is a unique physical address assigned to the unit by the manufacturer. MAC Address cannot be modified.

[Radio Firmware Version](#)

Shows the version information of the radio firmware.

[ACR Firmware Version](#)

Shows the version information of the ACR-201-G firmware.

3. Available Access Points

This field displays the available access points detected by the ACR-201-G Bridge.

Template

On this page (Figure 3), the users can save all the current settings that are under Wireless, Security, Advanced and Admin to a template. This template is helpful for programming multiple devices with identical settings. It also allows the user to obtain the current setting if the user accidentally clicks on the reset button. After a template is created, only the IP address, subnet mask and gateway are un-dimmed and can be modified. This feature is used to assign a new IP address to the next device that is being programmed. There are two sections on this page: create template and launch template.

OTC WIRELESS **ACR-201-G Web Management Utility**

Admin Info Template Wireless Security Advanced

Template
The functions on this page allow the user to create and launch an adapter settings template. This template can be used to program multiple devices with identical settings. Please see the User Manual for additional details.

Create Template
Create template:
Click this button to save the current adapter settings as a settings template to a file. This settings template file can then be uploaded with the 'Launch adapter settings template' button below to change the settings of a connected adapter.

Launch Template
Choose template:
Click the 'Select template' button to select the template file saved previously with the 'Create adapter settings template' button above.
Launch template:
Click this button to launch the adapter settings template in a separate page. Click the 'Upload adapter settings template' at the bottom of this new page to upload the new settings to the connected target adapter. Please check the settings shown before the uploading.

Figure 3. "Template" Web Page

1. Create template

[Create Template](#)

Click the "Create adapter settings template" button to save your current setting to the directory. The template saved should appear to be as figure 4. In the administration section of the template, the user has to fill the current IP addresses of the intended ACR-201-G unit in "Device Current IP Address". The desired new IP address will be filled into the "Device Target IP address" which will later be programmed into the intended ACR-

201-G unit when “Save settings template to an adapter” button at the bottom of the template page is clicked.

2. Launch Template

[Choose Template](#)

Click the “Select template” button to select the template previously saved that you prefer using to program the device.

[Launch Template](#)

Click the “Launch adapter settings template” button to finish uploading the template.

Adapter Settings Template Upload	
Template Upload	To program multiple adapters with this settings template, replace the current adapter with the next adapter to be programmed, insure the "Device current IP address" is set properly (169.254.98.200 for new adapters) and click the "Save settings template to adapter" button. For additional details on using the settings template, please see the User Manual.
Wireless	Wireless Mode: <input checked="" type="radio"/> Infrastructure <input type="radio"/> Ad-hoc Wireless Network Name (SSID): <input type="text"/> Desired BSSID: <input type="text"/> Channel: channel 1 (2412 MHz) ▾ Transmission Rate (Mbits/s): Best (automatic) ▾ Operational PHY Profiles: 802.11b/g Mixed Mode ▾
WEP Configuration	Enable WEP: <input type="checkbox"/> Default WEP Key to Use: WEP Key 1 ▾ Deny Unencrypted Data: <input type="checkbox"/> Authentication: <input checked="" type="radio"/> Open <input type="radio"/> Shared Key WEP Key Lengths: 64 bit (10 hex digits) ▾ WEP Key: <input type="text"/>
WPA Configuration	Enable WPA: <input type="checkbox"/> PSK Pass-phrase: password <input type="text"/> WPA Multicast Cipher Type: TKIP ▾ WPA Pairwise Cipher Type: TKIP ▾
Advanced Wireless	Bridging Mode: <input checked="" type="radio"/> WLAN Bridge <input type="radio"/> WLAN Client Fragmentation Threshold: 2346 <input type="text"/> RTS Threshold: 2432 <input type="text"/> Maximum Burst Time: 1000 <input type="text"/>
Administration	Device Name: ACR201-G Bridge <input type="text"/> IP Address Mode: <input checked="" type="radio"/> Static <input type="radio"/> DHCP Device Current IP Address: 169.254.98.200 <input type="text"/> Device Target IP Address: 169.254.98.200 <input type="text"/> Subnet Mask: 255.255.0.0 <input type="text"/> Gateway: 169.254.1.1 <input type="text"/>

Figure 4. Saved Template Page

Wireless

On “Wireless” page (figure 5), you can configure the basic 802.11g access point settings. Any new settings will not take effect until the access point is rebooted.

Wireless Mode:	<input checked="" type="radio"/> Infrastructure <input type="radio"/> Ad-hoc
	Select 'Infrastructure' to connect to a wireless access point, select 'Ad-hoc' to connect to another bridge or wireless station.
Wireless Network Name (SSID):	<input type="text"/>
	Enter the name of the wireless access point that this bridge will associate to. Leave this field blank to associate to any access point.
Desired BSSID:	<input type="text" value="000000000000"/>
	This provides manual selection for the desired Access Point to join with. The SSID for the Access Point still has to match. You can copy and paste the desired MAC address from the Info page.
Channel:	<input type="text" value="channel 1 (2412 MHz)"/>
	Select the radio channel that is used in ad-hoc mode. This setting has no effect in infrastructure mode. If the device experience interference (e.g. lost connections or slow data transfers) you may need to try different channels to see which is the best.
Transmission Rate (Mbps/s):	<input type="text" value="Best (automatic)"/>
	Select the speed at which the bridge will transmit data. The default selection of 'Best (automatic)' should provide the optimal mode of operation. If the wireless network is noisy or quiet, it may be necessary to use a lower or higher rate.
Operational PHY Profiles:	<input type="text" value="802.11b/g Mixed Mode"/>
	These profiles control a number of settings for the overall wireless network operation. In most cases the radio should be left in the default mode of 802.11b/g Mixed Mode.' See online Technical Manual for a more detailed explanation of each mode.
	<input type="button" value="Save"/> <input type="button" value="Cancel"/>

Figure 5 “Wireless” Web Page

Wireless Mode

Select 'Infrastructure' to connect to a wireless access point, select 'Ad-hoc' to connect to another bridge or wireless station.

Wireless Network ID (SSID)

Acronym for Service Set Identity. This is the name used to identify which wireless network (Access Points) the ACR-201-G is going to connect with.

Channel

The channel option is only available when the ACR-201-G is in ad-hoc mode. In infrastructure mode, the ACR-201-G would use the channel of the connected access point. If you experience interference (e.g. lost connections or slow data transfers) you may need to try different channels to see which is the best. Channels 1-11 are in the 2.4 GHz band.

Desired BSS

This provides manual selection for the desired Access Point to join with. The SSID for the Access Point still has to match. You can copy and paste the desired MAC address from the Info page.

Transmission rate (Mbits/s)

This is the speed at which the bridge station will transmit data. Normally you should select 'best' here. If your wireless network is unusually noisy or quiet, you may use a fixed low or high rate. The RF environment sometimes can be hostile to the highest data rate available. That gives rise to the need for trading off between data rate and link robustness.

Operational Profiles

These profiles control a number of settings for overall wireless network usage. Their meanings are self-explanatory. Four options are provided:

- “802.11 g only”: The radio unit operates at only 802.11g mode
- “802.11 b/g Mixed Mode”: This allows the radio units to connect to either 802.11b or 802.11g network
- “802.11 b/g Mixed Mode Long”: A long preamble provides universal compatibility for devices connecting to the Access Point
- “802.11 b only”: The radio unit operates at only 802.11b mode

Security

On this page (Figure 6) you can set the 802.11g security and encryption options. WEP is the wireless encryption standard. To use it, you must enter the same key(s) into the access point and the wireless stations. For 64 bit keys you must enter 10 hex digits into each key box. For 128 bit keys you must enter 26 hex digits into each key box. A hex digit is either a number from 0 to 9 or a letter from A to F. Leaving a key box blank implies a key of all zeros.

WPA Configuration	Enable WPA Authenticator to require stations to use high grade encryption and authentication.
WPA Enabled:	<input type="checkbox"/>
PSK Pass-phrase:	<input type="text" value="password"/> Enter a text pass-phrase between 8 and 63 characters.
WPA Multicast Cipher Type:	TKIP-WPA Default Currently TKIP is the only permitted setting.
WPA Pairwise Cipher Type:	TKIP-WPA Default Currently TKIP is the only permitted setting.
WEP Configuration	WEP is the wireless encryption standard. To use it you must enter the same key(s) into the bridge and the access point. For 64 bit keys you must enter 10 hex digits into each key box. For 128 bit keys you must enter 26 hex digits into each key box. A hex digit is either a number from 0 to 9 or a letter from A to F. If you leave a key box blank then this means a key of all zeros.
Enable WEP:	<input type="checkbox"/> Check this box to enable WEP. For the most secure use of WEP, also select "Deny Unencrypted Data" and set Authentication to "Shared Key" when WEP is enabled
WEP Key Lengths:	64 bit (10 hex digits) Select the WEP key size. This length applies to all keys.
Default WEP Key to Use:	WEP Key 1 Select the key to be used as the default key. Data transmissions are always encrypted using the default key. The other keys can only be used to decrypt received data.
WEP Key:	<input type="text"/>
Deny Unencrypted Data:	<input type="checkbox"/> Select this to require peers to use encryption. This is only effective when WEP is enabled.
Authentication:	<input checked="" type="radio"/> Open <input type="radio"/> Shared Key Select the type of authentication used when connecting to an access point. 'Open' is used if anyone can connect to the AP. 'Shared key' is used if both devices must know the encryption key.
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

Figure 6. “Security” Web Page

1. WPA Configuration

[WPA Enable](#)

Enable WPA (Wi-Fi Protected Access) security feature for high grade encryption and authentication

[PSK Passphrase](#)

Using the radial button, select the format type for your pass-phase. The pass-phase can be entered in either ASCII or HEX format.

- ASCII format must be a minimum of 8 characters to a maximum of 63 characters.
- HEX format must be 64 characters long using standard HEX notation.

IMPORTANT: Your pass-phase must match that of the AP's for proper communication and authentication

[WPA Multicast Cipher Type](#)

The type of Cipher being used in multicast packet communication. Currently only TKIP is supported.

[WPA Pairwise Cipher Type](#)

The type of cipher being used in unicast packet communication. Currently, only TKIP is supported.

2. WEP Configuration

[Enabled WEP:](#)

This check box allows users to enable or disable WEP feature. While WEP is disabled, all the other fields on this "Encryption" page are disabled too.

[Default WEP Key to Use](#)

Select the key to be used as the default key. Data transmissions are always encrypted using the default key. The other keys can only be used to decrypt received data.

[Deny unencrypted data:](#)

Check this field when the WEP is enabled to deny unencrypted data. This feature enables the adapter to drop all unencrypted packets received.

[Authentication](#)

Two options are available: "Open" and "Shared Key". The radio station must use the same authentication option as the Access Point in order to establish active link. 'Open' allows the radio station to connect an access point with open authentication process. 'Shared key' allows only stations that know the key(s) to get authenticated by Access Point with the same key(s).

[WEP key length:](#)

The 64-bit encryption is currently the 802.11 standard. The 128-bit encryption is supported by equipment from a limited number of vendors. Note that the “user-controlled” portion of the 64-bit encryption is just 40 bits (10 Hex digits) and that for the 128-bit encryption is just 104 bits (26 Hex digits)—3-bytes of the encryption key are internal to the encryption algorithm.

[WEP key:](#)

The keys allows hex number inputs with varying length depending on the type of WEP being enabled i.e. 64 or 128bit WEP

Advanced

On this page (Figure 7) you can configure the advanced 802.11g settings such as Bridging, Advance Wireless Settings, and Firmware Upgrade option.

1. Bridging

To activate the Bridging mode, the user needs to select WLAN Bridge option to allow multiple clients connecting to an ACR-201-G unit. If WLAN Client option is selected, the ACR-201-G unit can connect to only a single client.

2. Advance Wireless

[Fragmentation threshold](#)

Transmitted wireless packets larger than this size will be fragmented to maintain performance in noisy wireless networks. In the presence of hostile RF environment, frames longer than this threshold number, in bytes, are divided prior to transmission into one or more fragments less than or equal in length to the fragmentation threshold. The default value is set at 2346 bytes. This is the maximum 802.11 data frame size, such that no frames are ever fragmented. The valid range of fragmentation threshold is 1 to 3000.

Bridging	<p>Bridging Mode: <input checked="" type="radio"/> WLAN Bridge <input type="radio"/> WLAN Client</p> <p>Select the default choice 'WLAN Bridge' to connect multiple computers to this device. Use a Ethernet hub or switch to support multiple computers. Select 'WLAN Client' to connect only one computer to this device for special applications such as printer adapter, etc.</p>
Advanced Wireless	<p>Fragmentation Threshold: <input type="text" value="2346"/></p> <p>Transmitted wireless packets larger than this size will be fragmented to maintain performance in noisy wireless networks.</p> <p>RTS Threshold: <input type="text" value="2432"/></p> <p>Transmitted wireless packets larger than this size will use the RTS/CTS protocol to (a) maintain performance in noisy wireless networks and (b) prevent hidden nodes from degrading performance.</p> <p>Maximum Burst Time: <input type="text" value="1000"/></p> <p>The amount of time the radio will be reserved to send data without requiring an ACK. Adding a burst time should help throughput for 802.11g clients when AP is running in mixed mode. This number is in units of microseconds. A typical value would be 1000 microseconds. When this number is zero, bursting is disabled.</p> <p style="text-align: right;"><input type="button" value="Save"/> <input type="button" value="Cancel"/></p>

Figure 7. "Advanced" Web Page

RTS threshold

Transmitted wireless packets larger than this size will use the RTS/CTS protocol to (a) maintain performance in noisy wireless networks and (b) prevent hidden nodes from degrading performance. To minimize the potential packet collision associated with hidden nodes in a wireless network, IEEE 802.11 standard has the option to complete a "Request to Send (RTS)" and "Clear to Send (CTS)" two-frame exchange prior to sending the real data. This reduces the throughput of the real data. Since the probability of packet collision increases with the size of the packets transmitted, an optimum trade-off between data-throughput and data-integrity may be reached by turning on the two-frame exchange only for data packets exceeding a certain size. The number entered in this field is that threshold packet size in Bytes. For example, if "500" is entered, data packets with sizes less than 500 bytes are transmitted without being preceded by the RTS-CTS exchange and thereby taking a small risk of getting corrupted by packet collisions. If "2432" (the maximum 802.11 data frame size) or a larger number is entered, then every data packet is transmitted without being preceded by the RTS-CTS exchange and thereby maximizing the data throughput. The valid range of RTS threshold is 1 to 3000.

Maximum burst time

This is also known as PRISM Nitro (tm) technology. The technology uses fully standards-compliant methods that eliminate collisions in mixed-mode networks, while greatly increases the performance of both pure 802.11g and mixed 802.11b/g networks. The setting is for the amount of time the radio will be reserved to send data without requiring an ACK. This number is in units of microseconds. A typical value would be 1000 microseconds. When this number is zero, bursting is disabled. The valid range is from 0 to 100,000.

Chapter 4 Troubleshooting

No Page Displayed When Accessing the Web-based Utility

This occurs because the radio is extremely busy on the RF side or because the Ethernet connection is problematic. Try hitting the “Refresh” or “Reload” button of the web browser a few times. If the same message persists, it is unlikely that the problem is caused by a busy radio. Check your Ethernet connection. Make sure you use at least a legitimate CAT-3 cable, but preferably a CAT-5. Make sure that it is a straight-through cable between the radio and the computer, or a crossover cable between the radio and the hub, if a hub is involved. Check to make sure that the Ethernet card of the computer running the Web-based Utility program is functional and has a correct IP address and subnet mask setting.

No Radio Link

If the “Communication Strength” indicator on the “Link Info” tab shows 0%, check the following possible causes:

- Make sure that a target radio, an AP or another Station, is turned on and operating properly.

- Make sure that the “Signal Strength” indicator on the “Link Info” tab is not zero. A minimum of 20% is recommended. If the “Signal Strength” is less than 20%, the distance between the ACR-201-G and the targeted radio (an AP or another Station) may be too far. Decrease the distance to see if the radio link can be established.
- Make sure that the SSID is “*any*” or “**ANY**” or the same as that for the Access Point if operating in the infrastructure mode, or the same as that of the other Stations if operating in the Ad Hoc mode.
- Make sure that the encryption keys are entered correctly if WEP is enabled.
- Make sure that there is no RF interference present in the radio network.

No Network Connection While the Radio Link is Good

If the “Communication Strength” indicator shows good link quality on the “Link Info” tab but the host computer/device cannot be connected to the network, the cause might be one of the followings:

- Make sure that the Yellow LED on the radio is NOT constantly ON. If it is, Ethernet connection is questionable.
- Make sure the Ethernet Bridge Station of the host computer/device is properly installed.
- Make sure that the UTP cable connecting the radio and the host device meets at least the CAT-3 standard and has a straight-through connection if the host device is a PC, or a crossover if the host device is a hub or switch.
- Make sure that the IP address of the host computer/device is properly set up for the network.
- Make sure that the host computer/device has initiated some packet traffic since the radio was turned on. (That is the failure of the network connection is not just determined by trying to access the host from a remote point in the network.) Reset or re-power the host with the ACR-201-G turned on may be necessary in order for the ACR-201-G to “learn” the MAC address of the host computer.

Poor Link Quality

If the “Communication Strength” stays in the Poor range, check for the following conditions:

- Make sure that ***radio interference*** is not present in the radio network.

- Make sure that the radio is not surrounded by many strongly reflecting (metallic) surfaces. With multiple reflecting surfaces between the radio in question and the target radio, a severe “**multi-path**” problem may introduce high bit error rate despite a strong “Signal Strength”.
- Make sure that there is not a condition of severe **packet collision** caused by a “hidden node” problem. A “hidden node” problem is the situation where the RF signal from two or more Station radios cannot reach each other (but can reach the AP). In such situation, multiple Stations may attempt to transmit data packet to the AP at the same time and therefore cause packet collision. To solve this problem, either re-arrange the Stations in question such that the RF signals are mutually sensible by all Stations, or turn-on the RTS/CTS protocol by setting the “[RTS threshold](#)” on the “Config” tab to a reasonably small value (500, for example). There is no guarantee that the packet collision can be entirely eliminated by invoking RTS/CTS protocol, but the severity can be reduced enough to see visible improvement of the link quality.

Radio Interference

You may be able to eliminate RF interference by trying the following:

- Find the “channel” used by the source of the interference and coordinate your network and the interference source to be on channels that are at least 20MHz, but preferably 30MHz, apart.
- Reseat the ACR-201-G radio to a location where the interference is minimized; in general, increase the distance between the wireless devices and the device causing the radio interference.
- Avoid using 2.4GHz cordless phone in the vicinity of the radio
- Keep the computer with the ACR-201-G radio away from the microwave oven and large metal objects.
- Consult the dealer or an experienced radio technician for help.

Settings Appear not to be Modified

Check the version of the software to be upgraded and the software currently running in the Wireless bridge station. If they are the same, you must click “Reset to factory defaults” button on index.html page to make software upgrading take effect. This upgrade effectively overwrites the current software with a different set of factory defaults.

Technical Support

Please contact OTC Wireless for Technical Support.

E-mail: support@otcwireless.com

Telephone: 1-800-770-6689 (Inside USA), 011-510-490-8288 (Outside USA)

Appendix A: Limited Warranty

The seller warrants to the end user (“Customer”) that this product will be free from defects in workmanship and materials, under normal use and service, for one (1) year from the date of purchase from the seller or its authorized reseller. The seller’s sole obligation under this express warranty shall be, at the seller’s option and expense, to repair the defective product or part, or deliver to Customer an equivalent product or part to replace the defective item.

All products that are replaced will become the property of the seller. Replacement products may be new or reconditioned.

Appendix B: Regulatory Compliance

Federal Communications Commission (FCC) Compliance Information Statement

FCC Part 15 Declaration of Conformity (DoC)

The following equipment:

Product Name: Wireless Ethernet Bridge Station

Model Number: ACR-201-G WLAN is herewith confirmed to comply with the requirements of FCC Part 15 rules. The operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC ID:

A declaration of conformity with the requirements of the directives is available from OTC Wireless, Inc. 48507 Milmont Drive, Fremont, California 94538, USA 1-800-770-6698 (USA); 011-510-490-8288 (International)

FCC Rules and Regulations - Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by unplugging the equipment and then plugging it back in, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved by OTC Wireless could void the user's authority to operate the equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Exposure to Radio Frequency Radiation

Caution: The radiated output power of this device is far below the FCC radio frequency exposure limits. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, a minimum separation of 20 cm (8 inches) is recommended between the antenna and any persons.

European Community (EC) Directives Conformity and Restrictions

This product is in conformity with the protection requirements of EC Council directives 89/336/EEC, 73/23/EEC, and 1999/5/EC on the approximation and harmonization of the laws of the Member States relating to electromagnetic compatibility, safety of electrical equipment designed for use within certain voltage limits and on radio equipment and telecommunications terminal equipment.

Compliance is indicated by the CE marking 

Hereby, OTC Wireless, Inc. declares that this ACR-201-G is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

OTC Wireless, Inc. vakuuttaa täten että ACR-201-G tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

Hierbij verklaart OTC Wireless, Inc. dat het toestel ACR-201-G in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG

Bij deze verklaart OTC Wireless, Inc. dat deze ACR-201-G voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.

Par la présente OTC Wireless, Inc. déclare que l'appareil ACR-201-G est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE

Par la présente, OTC Wireless, Inc. déclare que ce ACR-201-G est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/CE qui lui sont applicables

Härmed intygar OTC Wireless, Inc. att denna ACR-201-G står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

Undertegnede OTC Wireless, Inc. erklærer herved, at følgende udstyr ACR-201-G overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF

Hiermit erklärt OTC Wireless, Inc., dass sich dieser ACR-201-G in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet". (BMW)

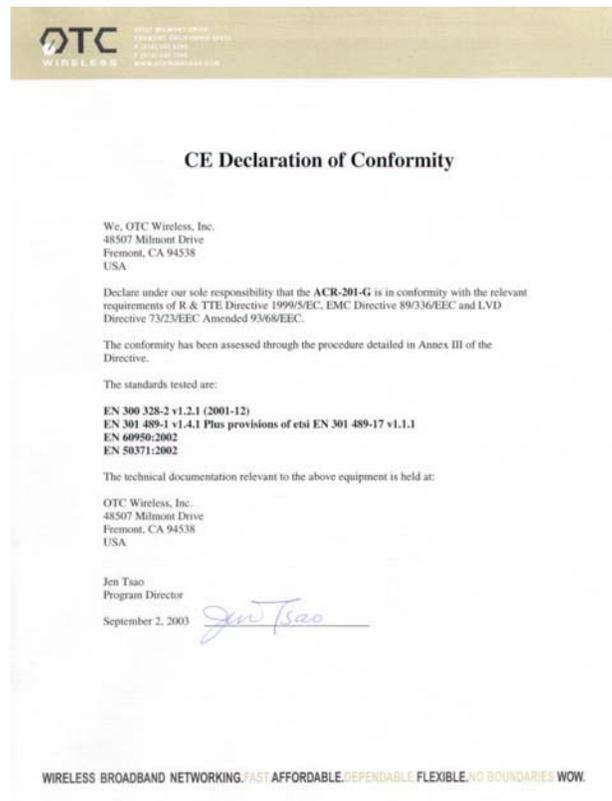
Hiermit erklärt OTC Wireless, Inc. die Übereinstimmung des Gerätes ACR-201-G mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG. (Wien)

ME THN ΠΑΡΟΥΣΑ OTC Wireless, Inc. ΔΗΛΩΝΕΙ ΟΤΙ ACR-201-G ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ

Con la presente OTC Wireless, Inc. dichiara che questo ACR-201-G è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.

Por medio de la presente OTC Wireless, Inc. declara que el ACR-201-G cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE

OTC Wireless, Inc. declara que este ACR-201-G está conforme com os requisitos essenciais e outras provisões da Directiva 1999/5/CE.



This product satisfies the radio spectrum requirements of EN 300 328-1, the EMC requirements of EN 301 489-17 and the safety requirements of EN 60950.

Notice:

In some countries of operation, using this product may be subject to specific restrictions as listed below. This product is intended only for indoor use. Outdoor usage may require licensing.

France

Restricted frequency band: only channels 10 through 13 (2446.5 MHz through 2483.5 MHz) may be used in France.

Not allowed for outdoor use in public areas.

Bande de fréquences restreinte : seuls les canaux 10 à 13 (2446,5 MHz à 2483.5 MHz) peuvent être utilisés en France.

Utilisation extérieure interdite dans les zones publiq