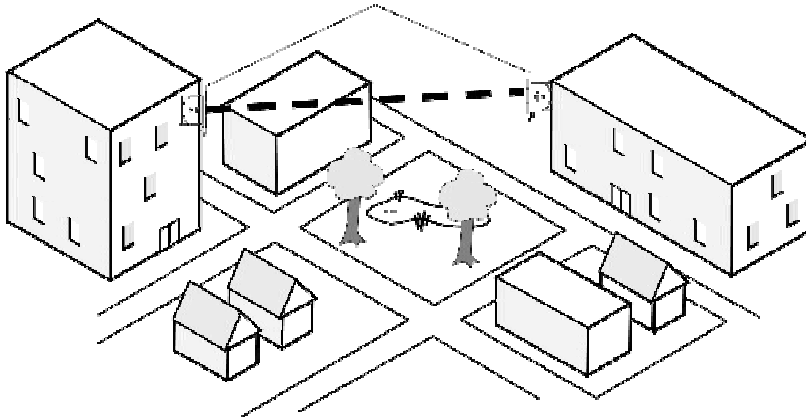




## Wireless Local Area Network Campus BridgeLINK-II™ Quick Installation Guide

---



---

## Notices

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. 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 turning the equipment off and on, the user is encouraged to try to correct the interference by one 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.

<b>FCC ID:</b>	MCI-377
<b>FCC Rule Part(s):</b>	15.247 AND 15.407
<b>Frequency:</b>	5.15-5.25, 5.25-5.35, and and 5.725-5.875 GHz
<b>Equipment Class:</b>	Low Power Communication Device Transmitter
<b>Output Power:</b>	50 mW

### Notes:

This device complies with Part 15 of 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. All interface cables must be shielded.

This device has shown compliance with new rules adopted under Dockets 87-389, 99-231, and 02-151 and is not affected by the Section 15.37, transition rule. Each radio is marked with its operating frequency.

FCC regulations require that a person knowledgeable in electronics and trained in the correct installation of this device professionally install this device. Professional installers have a responsibility to comply with FCC part 15 rules on antenna limits and amplification. Unauthorized modifications to the device could void the End-users authority to operate it.

This Product has been certified with the following antennas, and may only be used with antennas by the same manufacturer and with the same or less gain:

<u>Antenna</u>	<u>Model</u>	<u>Max Gain</u>
European Antennas	FPA19-58V-701/474	18 dBi
RadioWaves Sector antenna	SEC-5H-90CS	18 dBi
RadioWaves Parabolic Dish Antennas	SP4-5.8	34.8 dBi
Telex Yagi Antennas	5816AB	16.5 dBi

# 1

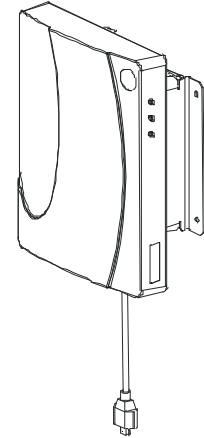
Welcome to wireless networking. The Campus BridgeLINK-II™ (CBL-II) is a module, which connects or bridges two 10BaseT wired networks, located in different buildings, together using a 10BaseRadio™ wireless link.

RadioLAN allows you to connect two buildings, which are up to 1 mile (1.6 km) apart, using a Campus BridgeLINK-II™ Processor Unit (CPU), a Companion Radio Module (CRM), and a 8.86 inch square directional antenna with a 19° angle of operation, for each building link. When using the CBL-II application, you need only install the components at each building, aim the antennas toward one another, and power the system on.

## Quick Setup

This document provides the simple steps required to install and setup the CBL-II. Please see the Campus BridgeLINK-II Users Manual located on the RMG website for more specific information. For a fast, successful installation, find a location that:

- has a non-switched electrical outlet.
- has access to the Ethernet backbone:
- is within range of the distant CBL-II



**Figure 1: Campus BridgeLINK-II Bridge Processor Unit**

# 2

## Assigning an IP Address to the CPU

You need an IP address to use the CBL-II's Web Management features. There are two ways to assign the CPU an IP Address for the TCP/IP Network. RadioLAN provides a utility called IPASSIGN, or you may use the Serial Port on the BBL.

### Assigning an IP Address using the Serial Port

1. Connect the CPU to a VT-100 terminal or a PC running terminal emulation software. Set up the terminal with the following settings: 9600 bits per second, 8 data bits, no parity, 1 stop bit, and no flow control.
2. Connect a standard DB-9 serial cable (not included) between a COM port on the terminal or PC and the CPU's DB-9 serial port, and power on the CPU. You will see a series of tests then a logon screen. Initially there is no password, so press Enter.
3. Arrow down to System Configuration, and press Enter.
4. Arrow down to IP Parameters, and press Enter.
5. Enter the IP Address, Subnet Mask, and Default Gateway IP Address.
6. Next, highlight DHCP Operation Mode. Press Enter until the Disabled is displayed.
7. Press Backspace to go to the previous screen. Arrow down to Configuration Changes, and press Enter.
8. Choose "Save Configuration Changes", and press Enter twice. The CPU will reset using the new IP address.

You may also use this same serial connection to configure and manage the CPU. See the manual for more information.

# 3

## Preparing a PC to use IPASSIGN

This utility allows you to assign an IP address to the CPU using a PC with a 10BaseT-network interface card installed. **Note: The PC must not be operating a DHCP server during this procedure.** The CPU supports connection to the network by way of a standard 10BaseT Ethernet Cable, which is typically used for connection to a hub, or a Crossover Cable, which is typically used for connection directly to a PC network interface card.

The CPU automatically detects the appropriate cable type (standard or crossover).

To connect the PC to the CPU, follow these steps:

1. Connect the RJ45-compatible cable to the PC's network interface card.
2. Connect the other end of the cable to the 10BaseT port on the CPU.
3. Make sure the 10BaseT Link light is on.

## Setting the CPU's IP Address

From either the supplied floppy disk, or Radiolan's FTP Site, <FTP://ftp.radiolan.com>, download the IPASSIGN utility. This utility automatically connects to the CPU, allowing you to enter an IP address for use on the TCP/IP network.

Save IPASSIGN.EXE to a local drive. These instructions assume that you are using the Windows Desktop.

1. Double Click on the IPASSIGN utility icon on the Windows Desktop. The utility starts.  
After the utility starts, it automatically searches the network (currently, only the CPU is connected) for any new CPUs. It finds the CPU that is connected, then lists the CPU's MAC Address in the **New BLINK unit** field.
2. Type in the appropriate IP address and Subnet Mask address into the fields on the screen, and then click the Assign button.

# 4

3. The utility assigns a temporary IP address, and displays a message asking if you want to further configure the CPU. Note the temporary IP address and make the following choices:

**Yes** This launches your web browser and connects you to the CBL-II Home Page, allowing you to assign a permanent IP address and to further configure the CPU. You must also disable DHCP to set a permanent IP address, and save all your settings. See the CBL-II User Guide for more information.

**No** This quits the utility. You will need to assign a permanent IP address, disable DHCP and save your settings from a PC running a web browser before powering off the CPU.

Your CPU is now ready to be configured using a browser. Please see the manual for more information on configuration and management options.

# 5

## Installing the CBL-II

You must not exceed the distance between buildings, either one mile (1.6 km) or one-half mile (.8 km). Make sure there are no obstacles between the two sites. You must locate the CPU at a distance from the antenna that is no farther than the cable will allow. The cable length is either 15 or 45 feet; this means you must consider all bends in the cable when determining your distance.

You must also locate the CPU in an area from which it has access to local network cabling and electricity. Before selecting an electrical outlet for use in powering the CPU, verify that the electrical outlet is non-switched (for example, it is not attached to a wall switch). You should also consider placing the CPU in a location where it is out of reach of the general public. You should install the CPU securely to a mounting surface (for example, a wall or ceiling).

**FCC regulations require that this device be professionally installed by a person knowledgeable in electronics and trained in the correct installation of this device.**

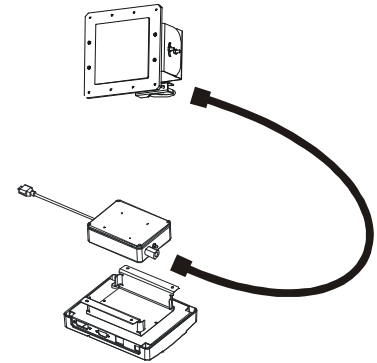
**All interface cables must be shielded.**

### Tools You Will Need

To install the CPU, you will need the following tools: drill, drill bit, screwdriver, screws, pencil, measuring tape.

### Mounting the CPU

When mounting the CPU, you must follow these steps.



**Figure 2: Connecting the Campus BridgeLINK-II**



# 6

Before mounting the CPU to the mounting surface, connect the connector at the end of the CRM's cable to the 15 pin D connector on the CPU.

Route the antenna cable from the antenna to the CRM and slip the cold-shrink tubing over the end of the cable before connecting it to the antenna. Connect the cable to the CRM using a clockwise rotation. Tighten the antenna connector so that it is snug but doesn't strip the threads of the CRM's connector. Complete the shrink tubing installation by following the instructions provided with the tubing.

Orient the CRM so that its cable does not cross over the mounting brackets and then insert the CRM into the mounting bracket so that it is flush with the rim of the bracket. Orient the CPU on the mounting surface in the location where you would like it to be attached. Use a pencil to mark the brackets screw hole locations onto the surface upon which you will mount the CPU.

At the location's screw holes, install any necessary anchoring devices. This is especially recommended when installing the CPU onto a sheet-rock or gypsum surface.

Hold the CPU up to the mounting surface, orienting the screw holes with the mounting anchors, then drive screws securely into the surface. Tighten down the screws.

## **Connecting the Network**

When connecting the CPU to the network hub or a PC, use a straight through or crossover RJ45-compatible, dual modular cable. The cable must not exceed the distance limitations provided by the IEEE 802.3 standard. After connecting the cable to the network, insert the connector into the port on the CPU.

# 7

## Grounding Considerations

RadioLAN recommends that you properly ground the directional antenna as described in mounting hardware installation instructions and required by your local ordinances.

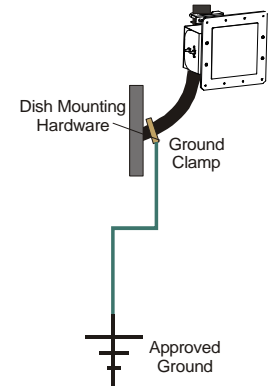
RadioLAN recommends that you connect the antenna assembly to a ground rod driven a minimum of 10 feet into the soil. For proper grounding of the antenna and cable, follow Section 810 of the National Electrical Code. Use UL-listed ground clamps and lugs.

## A Brief Word About Safety

If you chose to mount the antenna high up on a wall, make sure that you use the appropriate type of ladder. Follow ladder safety tips provided by its manufacturer. RadioLAN recommends that you have a partner available to secure the ladder and to offer assistance while you are on the ladder. RadioLAN recommends that you not mount the unit during stormy weather, on windy days, or anywhere near electrical cables.

## Installing the Antenna

There are many methods for mounting the antenna onto a wall. The assembly includes a U-bolt that allows you to connect the directional antenna to a standard size mounting assembly that is used for other directional antenna applications. Directional antenna wall-mounting assemblies are available at your local computer store or retailer who sells directional antennas or satellite services. The directional antenna uses a U-bolt with a nut on each end. Slide the mounting clamp through the two eyeholes on the backside of the directional antenna, then secure the clamp to the mounting equipment that you chose.



**Figure 3:  
Acceptable  
Ground Source**

# 8

## Choosing the Best Mounting Height

Make sure that you choose the appropriate mounting height for the directional antenna. You must consider the cable distance between the directional antenna and the CPU, and the level of accessibility for routing cable and mounting the CPU.

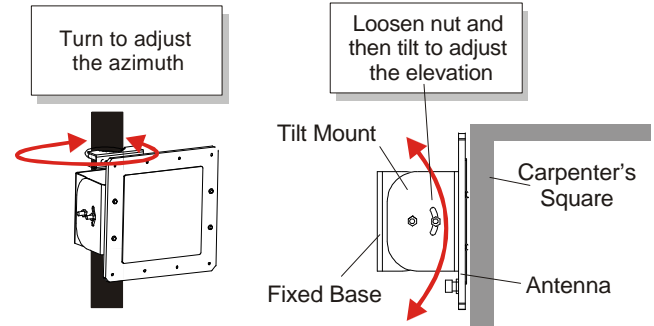
If the structure has an eave, RadioLAN recommends that you not place the antenna up so high into the eave that the roof of the antenna blocks a line-of-sight view to the antenna on the distant Campus BridgeLINK-II™ building. Before securing the antenna to the wall, verify that you can see the distant directional antenna and that the line of site is clear of all obstructions.

## Siting Each Campus BridgeLINK-II™ Antenna

Once you have installed and grounded the mounting bracket assembly (provided by others), you can point the directional antenna toward the location of the distant antenna.

### Tools You Will Need

To site the antenna properly, you will need a crescent wrench, a carpenter's square, a ladder, and a helper.



**Figure 3 - Aligning the Antenna**

# 9

## Adjusting the Antenna's Direction

To adjust the antenna's direction:

1. Loosen the U-bolts to turn the antenna into the correct side-to-side direction (azimuth).
2. Loosen the nut on the tilt mount to adjust the antenna to the proper elevation.
3. Tighten all the nuts and bolts to safeguard the antenna against directions changes during high winds.

## Siting Procedure

The Campus BridgeLINK-II™ uses a 19° angle of reception for each of its antennas. This means that, from the center of the directional antenna, you can angle away from your target for as much as 9.5° in any direction.

Sighting greater distances: If your application requires that the buildings are nearly one mile apart, it may be difficult to visually resolve the distant CBL-II antenna. In these cases you may need a compass, GPS, local maps, or other direction calibration equipment.

Greater distances increase probability for line-of-site blockages: As the distance between buildings increases, there is a greater likelihood for objects appearing that block the line-of-site between CBL-II sites. When planning applications with greater distances, avoid problems caused by new construction, or a large grove of trees between the two sites by placing the antenna higher. This decreases the likelihood for line-of-site blockages over time.

## Eyeball the Direction

Using a carpenter's square, align the square across the directional antenna's surface and adjust the antenna so that the carpenter's square points toward the distant Campus BridgeLINK-II™ antenna location.

# 10

After aligning the antenna, tighten the nuts on the mounting assembly so that it stays affixed in this direction and cannot be easily blown out of alignment by wind or heavy rain.

Next, connect the antenna cable to the back of the antenna. You can further align the two antennas, using the Campus BridgeLINK-II™ Manager Antenna Aiming program described on the next page.

## Apply Power to the CPU

After verifying that the antenna cable is properly attached to the antenna and the CRM, and after making sure that the CRM is properly attached to the CPU, you can apply power to the CPU following these steps:

1. Connect the CPU to the power transformer.
2. Connect the power transformer to the electrical outlet.

If the CPU is properly powered, you should notice that the green Power LED illuminates, and the LED on the CRM will flash. Once the connection to the distant CBL-II is made, the Radio LED will be illuminated.

## Aiming the Directional Antennas

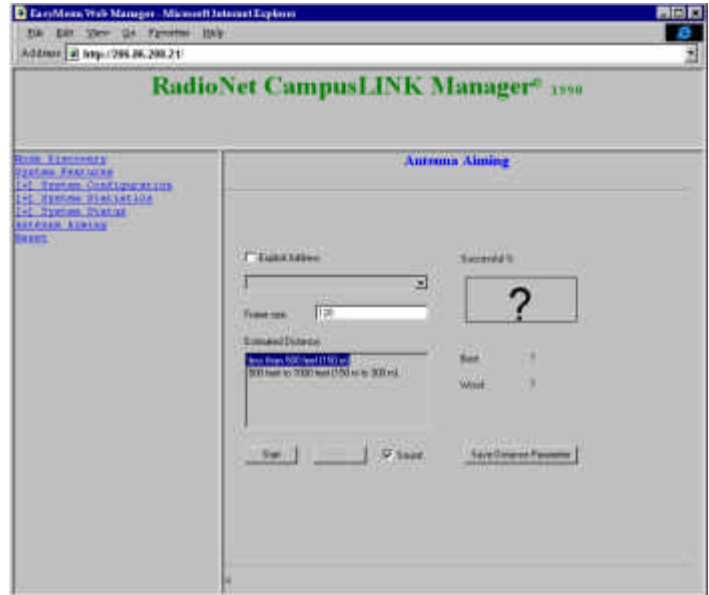


Figure 4: Antenna Aiming Page

# 11

Use the System configuration - ANTENNA AIMING page to help you aim the antenna and maximize signal quality. You may access this page via HTTP or Serial Port. See the Users Manual for more information.

## **Selecting the Distant CBL-II's Address**

The ANTENNA AIMING page allows you to select the remote CPU's Radio port name or explicit MAC address. If you place a check in the **Explicit Address** check box, the CPU Name drop-down list box changes to a field to enter a MAC address for the target CPU's radio port. If you don't immediately see the distant CPU or you are using the Serial port to run this program, use the Explicit Address.

## **Setting the Frame Size**

Select the desired frame size that you want to use for testing purposes. Similar to a PING, adjusting the frame size can vary test results. Enter your selection in the Frame Size field.

## **Setting the Estimated Distance Between Antennas**

The Estimated Distance list allows you to choose the distance between links. You must set this value on both sides of the link. Click a value in the list to make your selection. Using HTTP, you can save the entries on the page by clicking the **Save Distance Parameter** button. This change is stored immediately, and you do not have to save changes and reset. With the serial port, you must save changes on the **Configuration Changes** menu.

## **Starting and Stopping the Test**

You can begin and end the testing at any time. Click on the **Start** or **Stop** button to begin or end the test. Once you have started the test by clicking the **Start** button, you can view test results by viewing the **Successful %** field. You can

# 12

also view the best and worst-case scenarios by looking at results that appear in the **Best** and **Worst** fields. A successful link should be 99%.

The HTTP page also features an audio output of the **Successful %** field when you place a check mark in the **Sound** check box. With the Audio feature enabled, a Professional Installer can use two walkie-talkies or a cellular phone to adjust the antenna orientation.

## Test the Network

The final step is to ping a know address on one side of the bridge from a station on the other using the Windows “Ping” utility. If the ping is done successfully, you have properly installed the Campus BridgeLINK-II. It should provide you years of trouble-free service.

Now that you have set up the CBL-II, reference the users manual for additional information on managing the system.



185 Lewis Road - Suite 30

San Jose, California 95111

+1 (408) 365-6200

+1 (408) 365-7675

[www.radioLAN.com](http://www.radioLAN.com)