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Welcome

Congratulations! Through the kit you just purchased, you will discover the benefits and numerous applications of installing a Talking Lights system in your space.

You may be using it to guide people through your building, to automatically provide information about exhibition pieces without the use of complicated actions on the part of the viewer, or to tell you what is stored behind the locked door or in the crate in your warehouse without opening it, and those are only a few of the possibilities! In addition, Talking Lights systems can be programmed to fit your individual needs in your work space.

However you choose to use it, you will find that the benefits of installing a Talking Lights system will increase your productivity, improve your accessibility, and enhance your presentation.

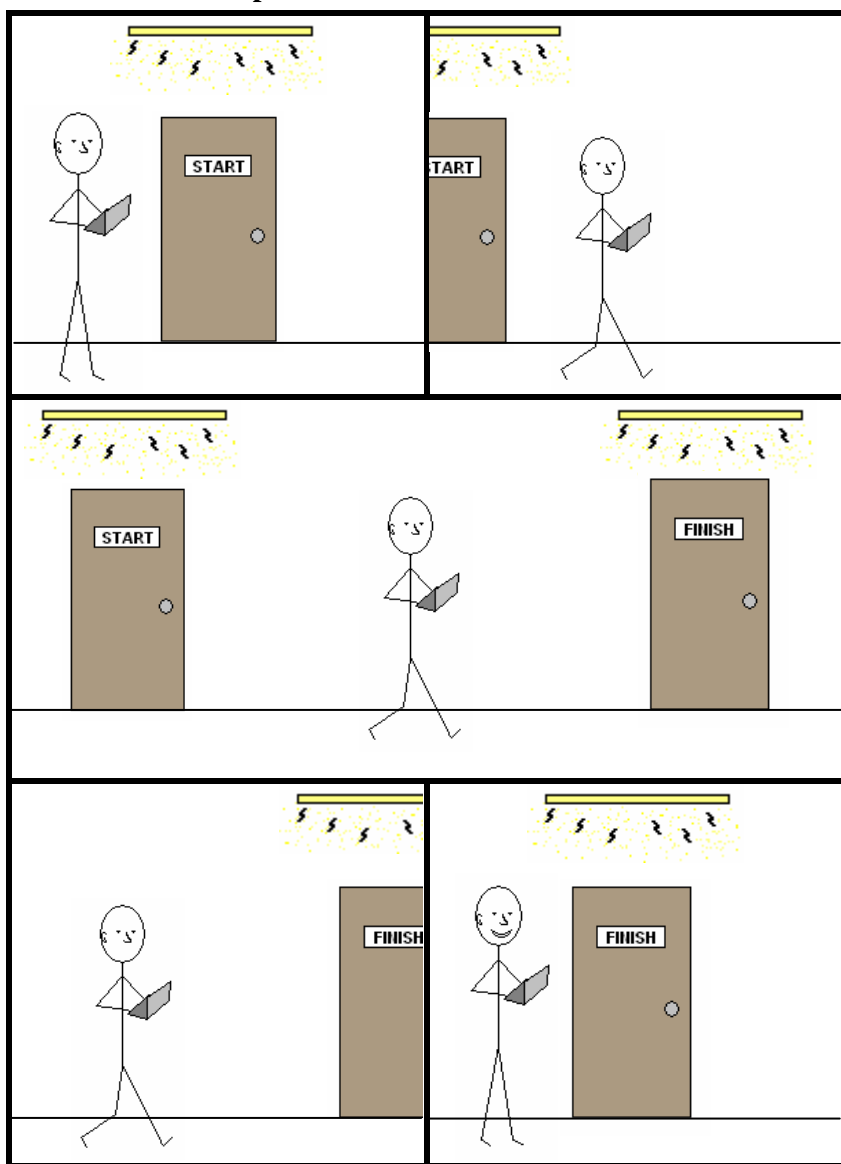
Using your new Talking Lights Demo Application

To use the Talking Lights Demo Application included in the installation package, you will need at least two Talking Lights enabled fixtures, one Talking Lights receiver and a laptop computer with the Talking Lights software and drivers installed and an open PCMCIA slot. Once the lights are installed in your space, and your computer is set up with the receiver in the PCMCIA card slot, you will be able to move through your facility and receive audio messages, which can be modified for your specific application.

The application will recognize the light as you approach it and play a specified pre-recorded audio clip, based on the proximity of the PCMCIA card to the light. Included are audio clips at preset proximities, but it is possible for you to create your own clips set to your proximity preferences, with two audio clips for each light.

Although this demo application only gives you a small sample of the possibilities, with enough lights installed in your building it is actually possible to create various paths through your entire building.

Demonstration Experiment



What's in the Package

Your product package contains the following:

1. Talking Lights® Receiver in the form of a PCMCIA Card
2. CD containing software and drivers
3. User's Manual

If any item is missing, contact Talking Lights Technical Support at 617-782-9300 or www.talking-lights.com/support.

You can also download the latest software and drivers from the Talking Lights website at www.talking-lights.com/support.

What Talking Lights[®] Systems Do

Talking Lights Systems enable mobile computing devices to determine their location and travel path easily, precisely and economically.

Talking Lights software applications can be developed to perform monitoring, guiding and locating tasks in hospitals, care centers, museums, trade shows, stores, office buildings, secure facilities, and anywhere that electric lighting is in use. You can also write your own applications for Talking Lights systems.

The Talking Lights System has three components:

- At least one modulated **light fixture** or **transmitter** to serve as a location beacon.
- A **receiver** to process the modulated light or input information from the light to a portable computing device.
- **Software** to process the signal from the light and take action based on the transmitted information.

How the Talking Lights Receiver Works

The Talking Lights Receiver makes it possible for mobile computing devices to determine their location when combined with a Talking Lights transmitter and application software.

The Receiver is a **PCMCIA card** that fits into the PCMCIA (PC card) slot of a laptop or handheld computer and serves as the interface between the location source — a Talking Lights transmitter — and the application software that utilizes position information. This functionality is encapsulated in an easy-to-use, open application programming interface (API) based on serial port communications.

Location sources include any fluorescent light driven by a Talking Lights Electronic Ballast. The light is modulated to create the Talking Lights communication link. Each light transmits its own unique location beacon identification code, permanently programmed in a Talking Lights light or ballast.

When a mobile computing device containing the Receiver approaches the light, an optical sensor in the Receiver detects the light. Circuitry inside the Receiver decodes the signal and sends the ID code to the application software of the mobile computing device.

Several different command modes are available, depending on your needs. For example, the Receiver firmware can check incoming location source ID codes and send only valid codes to the application. It can also compute a relative distance measurement based on incoming signal strength.

To simplify the task of parsing the data, a data structure based on the eXtensible Markup Language (XML) is the standard format for ID codes, distance measurements, and errors communicated to the host. If desired, the receiver can also send raw characters to the host as they are decoded, without error checking or formatting.

The Receiver contains the following components:

- **PCMCIA connector** Insert this connector into the Type II PCMCIA (PC Card) slot on your computer.
- **Optical sensor** Point the sensor at the Talking Lights light source. Sensitivity is at its peak along the long axis of the Receiver and drops to half at $\pm 20^\circ$ from that axis.
- **Red LED** This light is illuminated when the Receiver has power.
- **Green LED** This light is illuminated when the Receiver acquires a Talking Lights source or another light source operating at the same frequency.



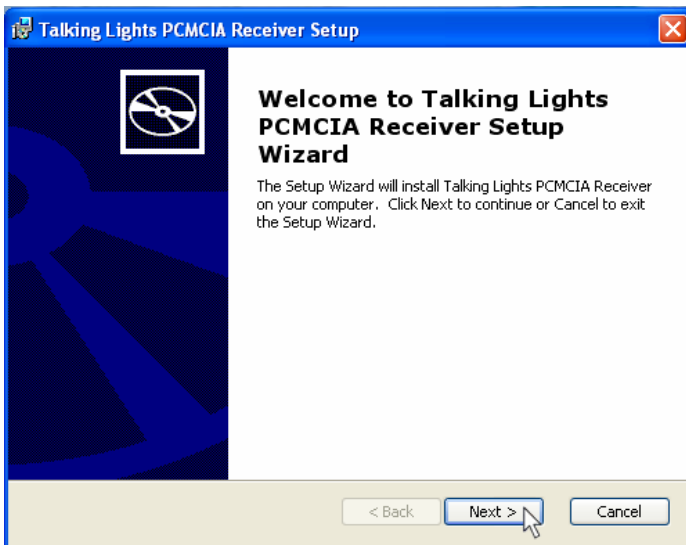
Installing Talking Lights[®] Software and Drivers

IMPORTANT! DO NOT insert the PCMCIA Card in your computer before installing the software and drivers.

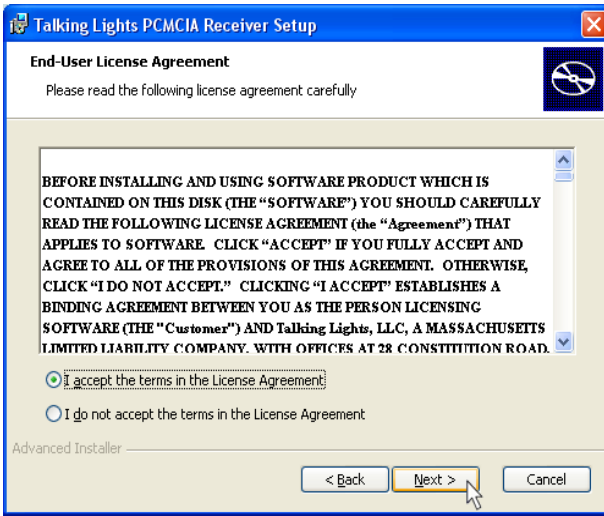
Windows XP/2000 Installation Instructions

For installation on Windows XP Home or Windows XP Professional.

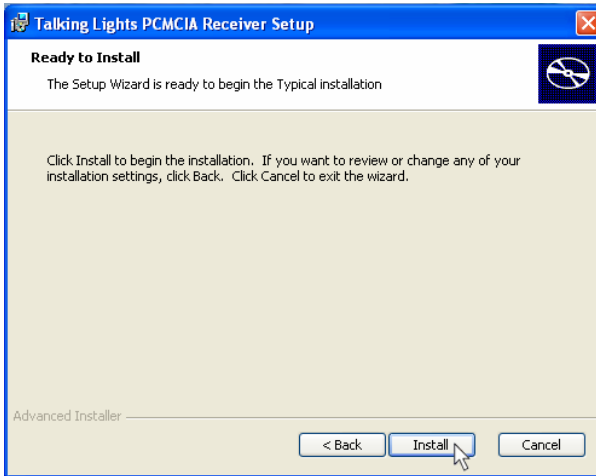
1. Insert the Software and Drivers CD in your CD-ROM drive. Setup should begin automatically. If it does not, navigate to the CD and double click on the *Setup.exe* icon.



2. Click the *Next* button.
3. Read and accept the Talking Lights End-User License Agreement.

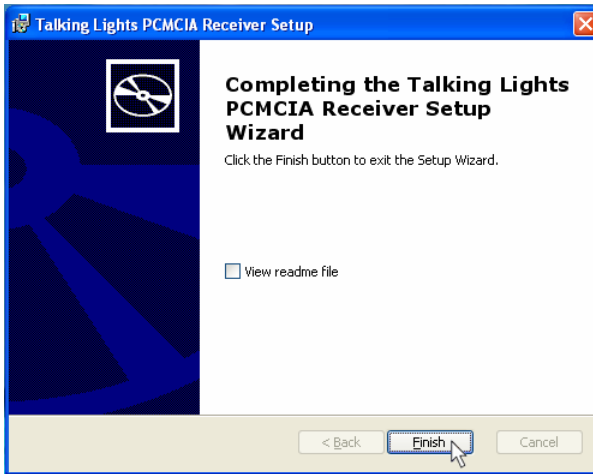
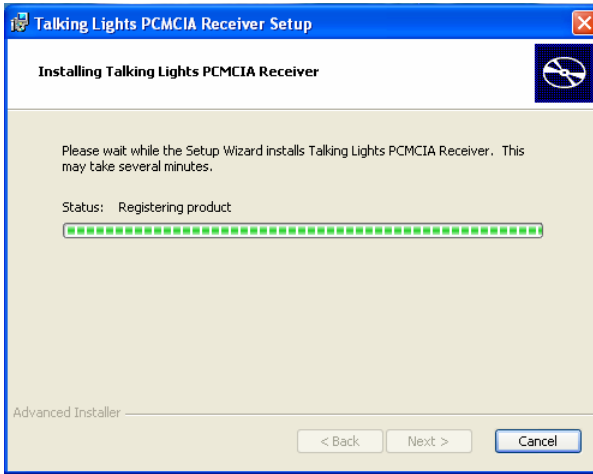


4. Click *Next* to proceed.



5. Click *Install* to begin installation of the software and drivers.

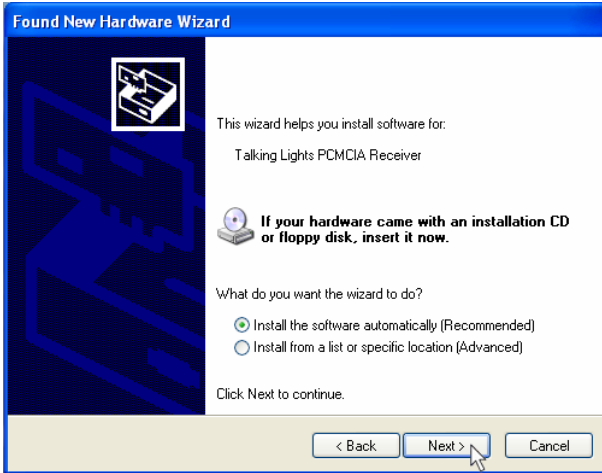
Installation will proceed:



6. Click *Finish* when the installation is complete.

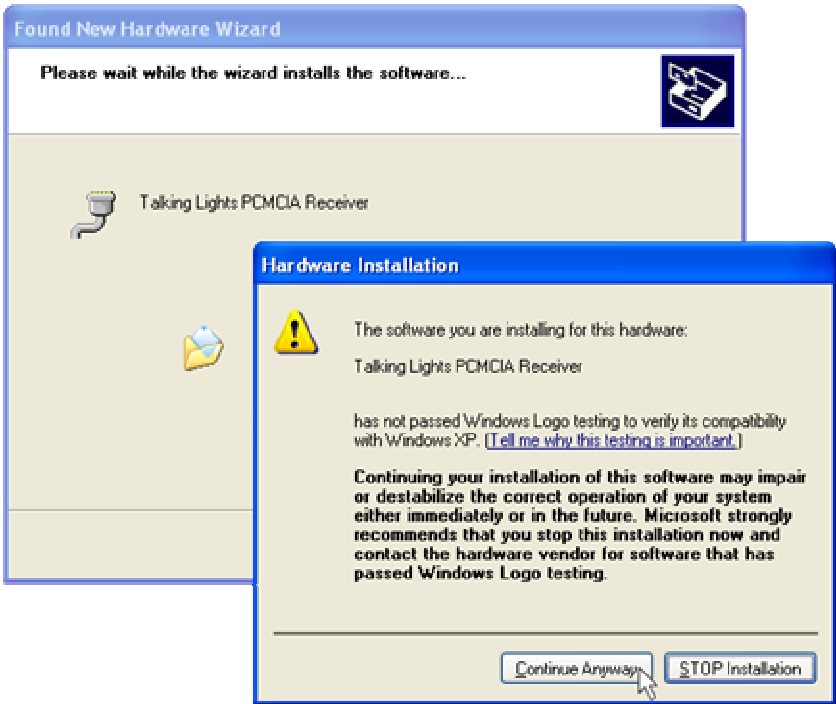


7. Insert the PCMCIA Card into the PCMCIA Slot on your computer. When the card is fully inserted, the red light will illuminate briefly. The plug and play interface will detect the new hardware inserted and will try to identify a driver for it. Select the *No, not this time* option and click *Next*.



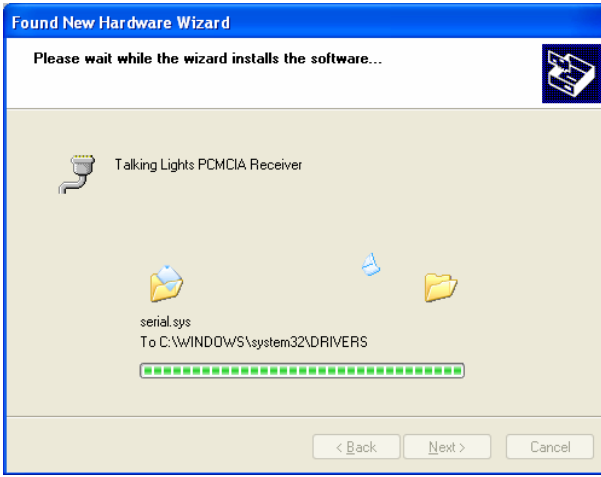
8. With the Talking Lights CD in your CD-Rom drive, you can install the drivers from this disk. Select *Install the software automatically* (default) and click *Next* to search for the drivers on the CD disk.

If you are installing from a different location, select ***Install from a list or specific location*** and identify the location of the *sktsio.inf* file. The most recent version of this file and corresponding drivers is always installed by default into *C:\Program Files\Talking Lights\Drivers\Win9x2kXp*.



9. Click ***Continue Anyway*** on the Hardware Installation window.

Installation will proceed:



10. Click ***Finish*** to complete the installation.
11. You may now remove the Talking Lights CD from your CD-Rom drive.
12. Congratulations! Installation is now complete.

Uninstalling Talking Lights® Software and Drivers

Uninstalling the software and drivers is a two-step process. The steps are independent of each other and can be completed in any order.

Uninstalling the Software

1. Select **Start->Programs->Talking Lights->Uninstall** and follow the instructions on the screen.

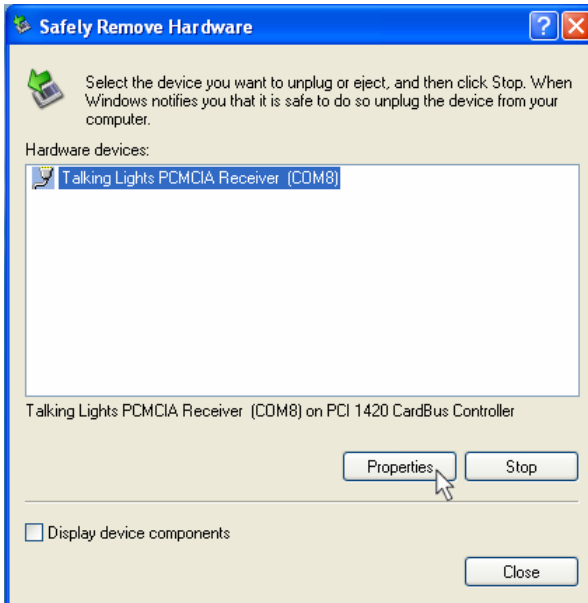
Note: You do not need to uninstall an older version of Talking Lights software before installing a newer version.

Uninstalling the Drivers

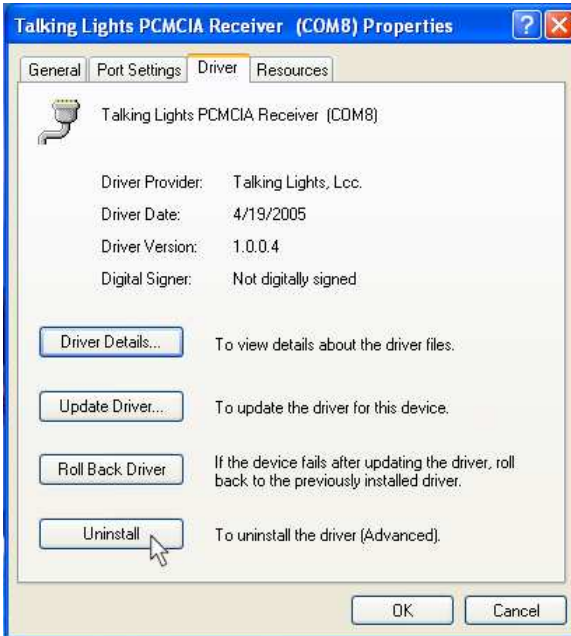
1. Insert the PCMCIA Card in the PCMCIA slot. The **Safely Remove Hardware** icon will appear on the right of your taskbar (usually at the bottom right corner of screen).



2. Double click the **Safely Remove Hardware** icon. This will bring up a **Safely Remove Hardware** dialog box.



3. In the Hardware Devices list, select ***Receiver Card*** and click the ***Properties*** button.



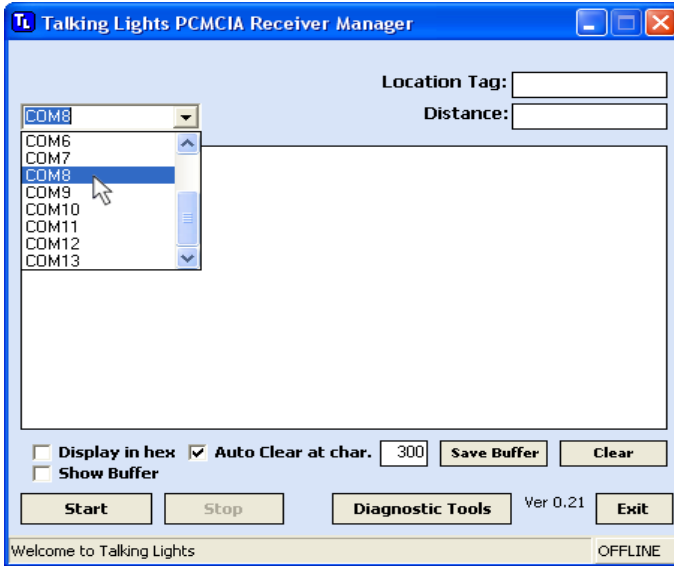
4. In the *Talking Lights PCMCIA Receiver Properties* window select the *Driver* tab and click the *Uninstall* button at the bottom.
5. Click the *OK* button at the bottom of the dialog box. This completes the un-installation process.
6. When un-installation is complete, remove the PCMCIA Card.

Running the Receiver Manager Application

Basic Operation

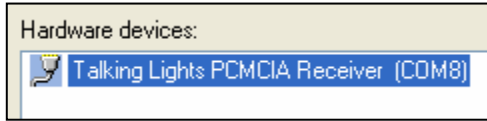
The **Receiver Manager** application allows you to view received data and control the Receiver's operating mode. It is also a useful tool for application development and installation of Talking Lights Systems.

1. To access the Receiver Manager, click **Start->Programs->Talking Lights->Receiver Manager** or double-click **Shortcut to TLReceiverManager** on your desktop.

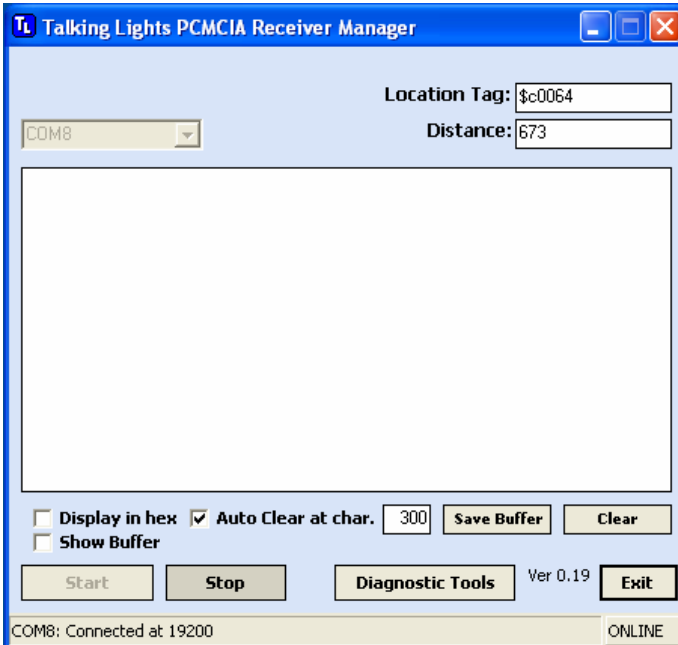


2. Select the COM port (Serial Port) on which the Receiver is installed. The COM port is assigned at installation and varies from machine to machine. You can identify the COM port on which the Receiver is installed by double-clicking the **Safely Remove Hardware** icon in your task tray:





3. In the list of displayed Hardware Devices, identify the Receiver Card and note the COM port number next to it in parentheses (e.g. COM8). Click *Close* to close the window.



4. Select the appropriate COM port from the drop box on the top left of the Receiver Manager application and click the *Start* button.

Note that your Talking Lights encoded light fixture must be installed, turned on, and in the field of view of the Talking Lights receiver in order to acquire the location tag and distance.

Additional Operating Information

Location Tag and Distance

Note that the **status bar** at the bottom of the Receiver Manager box specifies “*Connected at 19200.*” The Receiver is now turned on. Location tag and distance measurement will be displayed in the top right corner of the screen only if the Receiver is able to acquire a signal from a Talking Lights transmission source.

Distance measurement is a relative, unitless number based on received signal strength. It typically ranges from 477 to 900, with larger numbers indicating closer range. Because optical sensor sensitivity is dependent on the angle of incidence, signal strength and reported distance value are affected by not only the linear range but also the relative angle between the receiver and transmitter, and by obstructions between the receiver and transmitters. The standard sensor has a half-power angle of approximately $\pm 20^\circ$.

Stopping Receiver Operation

You can stop Receiver operation at any time by clicking the ***Stop*** button. You can exit the Receiver Manager application by clicking the ***Exit*** button.

For a detailed explanation of the functionality of the other buttons and controls in the Receiver Manager, see the *Advanced Operations (Using Diagnostic Tools)* section below.

Advanced Operation (Using Diagnostic Tools)

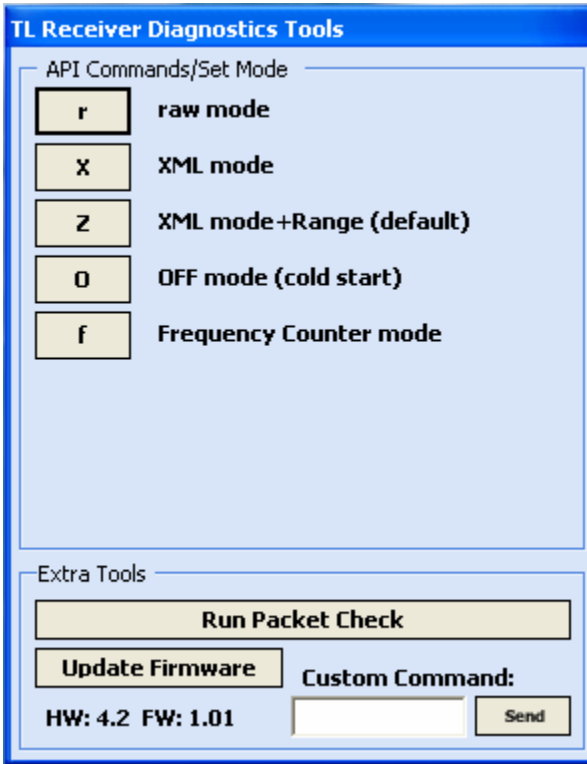
Show Buffer The large white rectangle in the center of the Receiver Manager window is blank by default. Checking the **Show Buffer** box causes the Receiver Manager to display characters in this window as they are captured from the Receiver.

When receiving Talking Lights ID tags, data in the buffer will be in XML format, with the location tag ID and relative distance measurements embedded in it.

The buffer can be set to auto-clear after a specified number of characters. Use the **Auto clear at char.** control in the control in the Receiver Manager window. It can also be cleared manually, saved to a file, or set to display in hexadecimal instead of ASCII.

Diagnostic Tools Clicking on the **Diagnostic Tools** button brings up the Diagnostic dialog box, which provides more control over the Receiver. When opening this dialog box, the **Show Buffer** check box in the main TL Receiver Manager window is automatically checked. Many diagnostic tools produce data that is not displayed in the location tag or distance fields, so it is useful to see the entire buffer of data coming from the receiver.

The Diagnostic dialog box is divided into two sections: API Commands and Extra Tools.



The API commands in the dialog box above are the most commonly used commands.

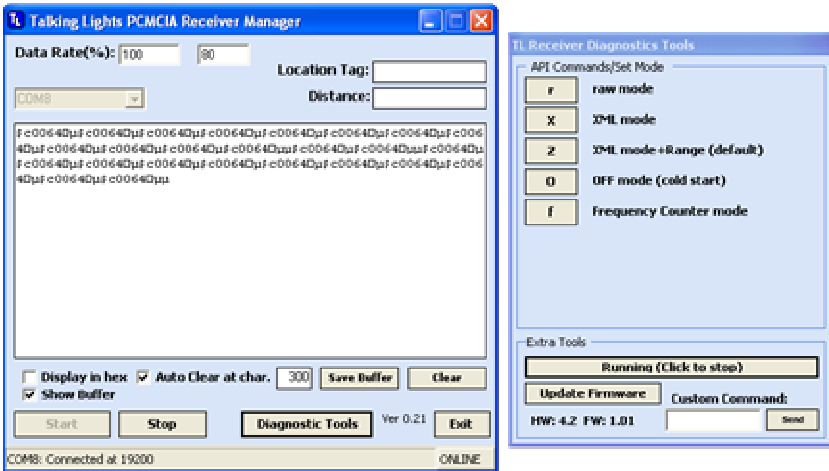
- **Raw mode** performs no additional processing or formatting: characters are passed to the host application as they are received and decoded.
- **XML mode** searches for Talking Lights location tag IDs with valid checksums. Once a good tag is received, the Receiver sends an XML-formatted string with the tag ID.

- ***XML mode+Range*** is the mode used by default. In addition to the location tag ID, the XML string includes distance measurement information.
- ***Off mode*** disables transmission of location and distance data to the host computer.
- ***Frequency Counter mode*** is a diagnostic mode used to plan and commission a Talking Lights installation. Instead of searching for location tags, the firmware measures the ripple frequency of the incoming light and reports it in its XML string. Talking Lights ballasts modulate the lamp drive frequency to encode location tags.

Most commercial ballasts operate at a frequency lower than that typical of Talking Lights ballasts, but a few operate close enough to cause interference problems. The frequency counter can be used to determine the operating frequency of most fluorescent lights, not just Talking Lights. Hence the frequency counter can be used to determine if an interference problem is likely. See the *API Command Reference* section of this manual for more details.

- The ***Packet Check*** button runs a developmental packet checker in Receiver Manager. It places the Receiver in raw mode and counts received location IDs. This count and the percentage of packets with valid checksums are displayed as shown below.

Currently this tool computes its percentages based on complete packets. Partial packets are ignored. The packet checker may be stopped by clicking on the button again.



- The **Update Firmware** button starts the process of installing updates. For more information about updating, contact Talking Lights Technical Support at 617-782-9300 or online at www.talking-lights.com/support.
- The **Custom Command** text box and **Send** button allow you to send API commands that are not included in the dialog box. While the API commands included in the box are the most commonly-used commands, the complete command set is described in *API Command Reference* section of this manual. These additional commands set the Receiver to different output modes.
- The Receiver's **hardware and firmware version numbers** are displayed in the lower left corner of the dialog box. These numbers are obtained from the Receiver PCMCIA Card when the Receiver Manager application first connects to it.

Running the Demo Application

The Talking Lights® Receiver is shipped with a simple Demo Application that demonstrates basic location-based functionality.

The Demo Application is written in C# with source code that can be downloaded from the Talking Lights website at www.talking-lights.com/support and is also provided on your installation CD.

The Demo Application provides developers for Talking Lights technology with a starting point for application development. It allows you to configure your Talking Lights receiver to trigger your PC to play audio messages associated with specific locations identified in an XML layout file.

The Demo Application is provided “as is” with no warranty and should be used for reference purposes only.

Configuring your XML Layout and Paths File

Before running the Demo Application, you must configure the layout XML file by editing the default *layout.xml* already installed on your computer.

To do that, navigate to the *C:\Program Files\Talking Lights\DemoApp* folder and open *layout.xml* with your favorite editor (Windows notepad works well).

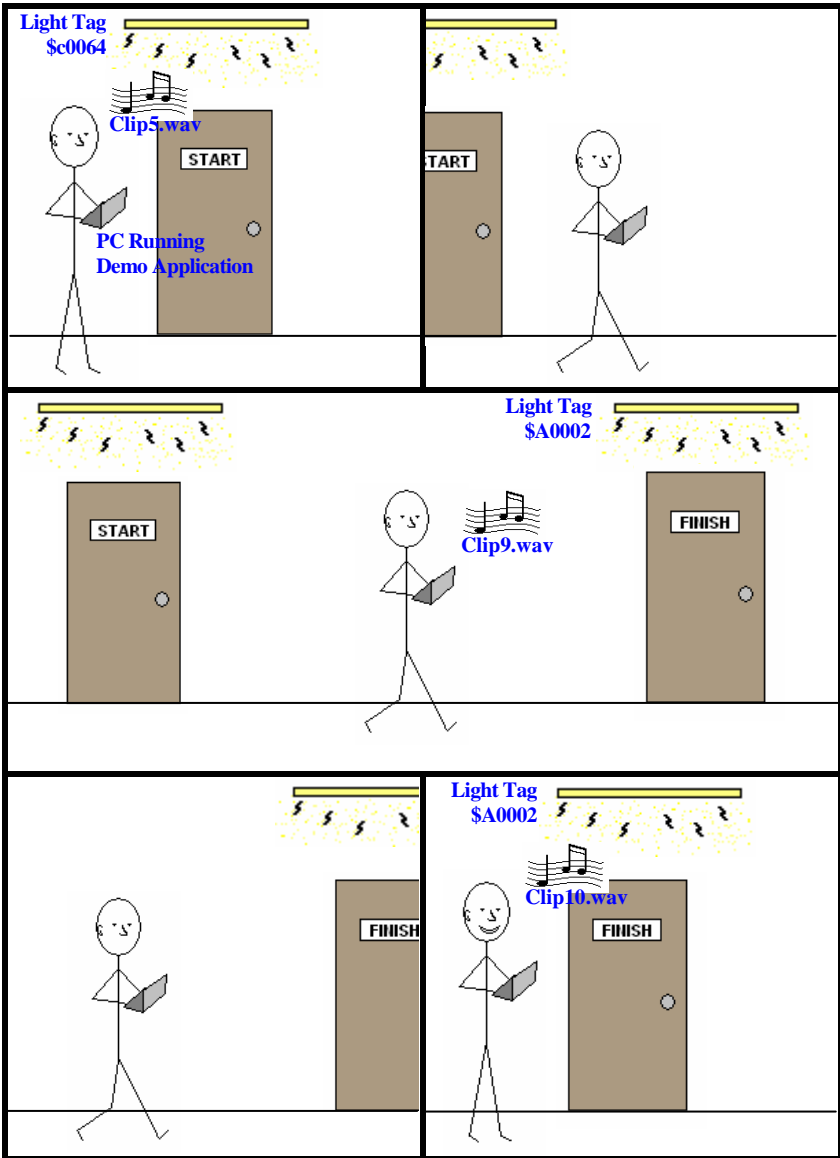
The file looks like this:

```
<?xml version="1.0" encoding="utf-8"?>
<layout>
  <path id="Test One">
    <light seq="1" tag="$c0064"
threshold="650" visited="no">
      <clip1>Clip4.wav</clip1>
      <clip2>Clip5.wav</clip2>
    </light>
    <light seq="2" tag="$A0002"
threshold="650" visited="no">
      <clip1>Clip9.wav</clip1>
      <clip2>Clip10.wav</clip2>
    </light>
  </path>

  <path id="Test Two">
    <light seq="1" tag="$c0064"
threshold="650" visited="no">
      <clip1>Clip1.wav</clip1>
      <clip2>Clip2.wav</clip2>
    </light>
    <light seq="2" tag="$A0002"
threshold="650" visited="no">
      <clip1>Clip8.wav</clip1>
      <clip2>Clip9.wav</clip2>
    </light>
  </path>
</layout>
```

It may help to refer to the Demonstration Experiment figure on the next page to understand the context in which the variables in the layout file affect the performance of the Talking Lights system.

Demonstration Experiment



In the Demonstration Experiment illustrated in the figure, you can see how the example XML layout file would control the performance of the receiving PC.

Imagine, as shown in the first illustrated frame, that a user activates a receiving PC in “close proximity” to the light transmitting tag “\$c0064.” Also imagine the Demo Application software running on the receiver’s PC is configured to follow a path labeled “Test One,” as in the example XML layout file, perhaps for guiding visitors to find an office labeled “Finish.”

In the first frame, the receiver, in close proximity to the light tagged \$c0064, will initiate the playback of a “close proximity” audio clip. In this case it is stored in PC file “Clip5.wav” as indicated by the XML layout file. Based on information provided by this audio file, the user makes his way in the direction of the “Finish” office.

As the user comes into “long range” of the light labeled \$A0002, the computer plays message “Clip9.wav.” Ultimately he reaches the office door, and the computer plays the “close proximity” message “Clip10.wav.” The XML file controls the distance at which the “long range” message transitions to the “close proximity” through the threshold variable set to 650 in the example XML layout file.

In more detail, the XML file describes two different sets of messages for a two light Talking Lights network. These message sets are called Test One and Test Two as indicated by the “path ID” in the XML file. The current path is selected by the user from a drop box on the User Interface of the Demo Application. Within each path, each light has two audio clips associated with it, one for long range and another for close proximity.

When the Demo Application is running it receives the location tag from the Receiver and matches it against the currently selected path. When a light in the path or layout is identified, the audio clip is played. If the range indicator exceeds the threshold value specified for the given light, the clip2 wav file is played. If the value is below the threshold, the clip1 wav file is played.

You can configure the Demo Application to work with any number of Talking Lights sources and play any wav file. The Demo Application ships with a set of prerecorded wav files located in the *C:\Program Files\Talking Lights\DemoApp\audio* folder.

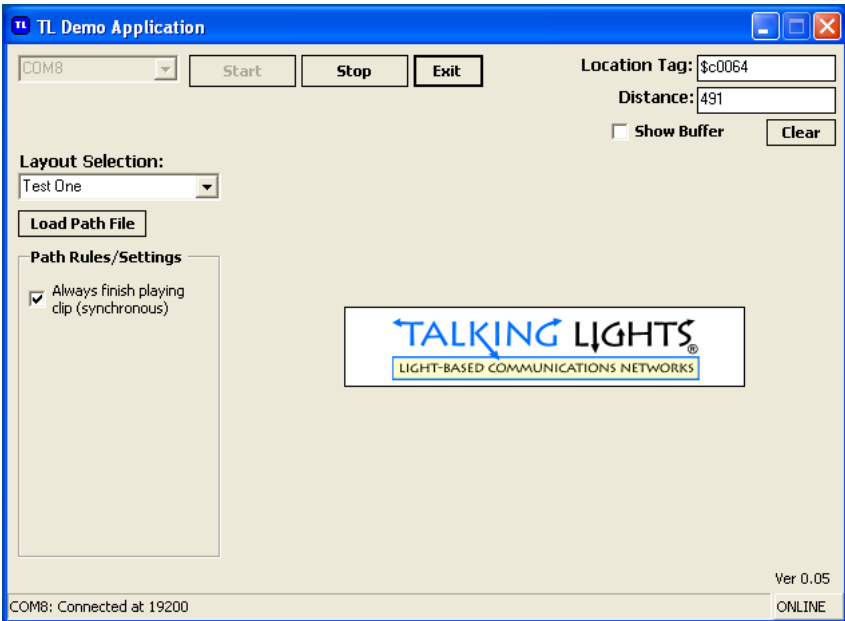
To make the demo application work for your lights you need to **modify** the XML file to recognize the unique ID code emitted by your light or lights. You enter this light code in the “tag” value of the XML file. You must enter the code for each individual light you have purchased.

The unique ID code for your light is the number that appears in the Location Tag box of the Receiver Manager box. If your Talking Light transmitter tag ID is \$c8888, for example, your *layout.xml* file will look like this:

```
...
    <light seq="1" tag="$c8888" threshold="650"
visited="no">
        <clip1>Clip4.wav</clip1>
        <clip2>Clip5.wav</clip2>
    </light>
...
```

Testing the Demo Application

When you've configured the *layout.xml* file (see previous section) you're ready to run the Demo Application. To do so, follow these steps:



1. Select **Start->Programs->Talking Lights->Demo Application** from the **Start** menu.
2. The Demo Application will load the *layout.xml* file by default. A list of paths available will be displayed in the Layout Selection drop-down box. If you have created a layout file with a different name, click **Load Path File** and open the file you created.
3. Select the COM port for the Receiver Card from the Drop Box (See *Basic Operation* in the *Receiver Manager* section of this manual to determine on which COM port it was installed).

4. Make sure the correct path is selected from the Layout Selection drop box, and click the **Start** button. The current location tag read by the Receiver will be displayed in the top right corner along with the distance measurement. **Note:** *if no Talking Light sources are acquired, no value will be displayed.*

5. When the Demo Application identifies a Talking Lights source with a location tag that matches a light tag in the currently selected path (e.g. \$c8888), the appropriate wav file will be played. For details, see the previous section of this manual.

Note: The Demo Application will remain silent until a new ID is acquired or the proximity threshold for the current ID is crossed. You can reset the current location ID by clicking the **Clear** button.

By checking/unchecking the **Always finish playing clip** checkbox, you can specify how the Demo Application behaves when a new location is acquired while the wav file of the old location is still being played. You can also check the **Show Buffer** checkbox to monitor location tags as they are being processed.

Using the Serial Communication Interface

The Talking Lights® Receiver emulates a serial interface that can be accessed in the same way as a Windows serial port. The smallest available COM port number is assigned to the Receiver during driver installation and may differ for each computer.

Communication with the Receiver is accomplished by a set of predefined API commands. All these commands are defined in the *API Command Reference* section of this manual.

Settings for the serial port interface for the Receiver are as follows:

Speed:	19200
Databits:	8
Parity:	none
Stopbits:	1
Flow Control:	none

When the COM port on which the Receiver is installed is opened by the Receiver Manager, the Demo Application or a custom application, the Receiver is powered, and the red LED is illuminated.

Writing Custom Talking Lights® Enabled Applications

Writing custom Talking Lights enabled applications requires a basic knowledge of serial communication. Many development environments can be used. The Receiver emulates a serial port and can be accessed the same way any COM port is accessed on your computer.

When the port is opened, communication is established by sending API commands. The Receiver will boot up in the *data off* mode of operation and will not send out data until another mode is selected. To change the mode of operation, an appropriate command must be written to the COM port. See *API Command Reference* for a complete list of commands and modes.

The two most common modes for custom application are *Z mode* and *r mode*:

Z mode The most basic mode of operation is *Z mode*. In *Z mode*, the Receiver Card applies CRC error checking and calculates the distance measurement before sending data to the application. A typical output is as follows:

```
<TL><id>$c0064</id><am>678</am></TL>
```

where \$c0064 is the ID tag of the Talking Lights source and 678 is the relative distance.

CRC checking is performed by the Receiver, and only “good” data is processed. If an incorrect CRC checksum is encountered the Receiver ignores it.

The relative distance value between the `<am>` and `</am>` tags is the same distance value shown in the Receiver Manager application. It is a relative number based on received signal strength, typically ranging from 477 to 900, with larger numbers indicating closer range. Because a 10-bit analog-to-digital converter generates the number, its value never exceeds 1023. As with all XML data, it is sent as an ASCII string.

r mode Another common mode is *r mode*, or raw mode. In *r mode*, all information received by the Receiver is sent directly though the serial port, with no extra parsing or error checking. A typical output is as follows:

```
$c0064□μ$c0064□μ$c0064□μ$c0064□μ
```

In this example the data consists of an ID tag and a two-character CRC checksum at the end. **Some CRC Checksum characters might not be printable.**

Additional modes are described in the *API Command Reference* section.

API Command Reference

Below is a list of all API commands. Most are not required for basic functionality and should only be used in custom application development. For information on using these commands, see the *Using Serial Communication Interface* section.

Command	Char	Description
PrintVersion	'v'	Prints version information serial port in XML format: firmware: <fw>1.01</fw> PCB hardware: <hw>4.4</hw> Detectors present: <dp>8</dp> (an ASCII number corresponding to the 4 possible sensor locations, in the least significant nibble). This means detector 4 is the only one present. The other common value is 10, detectors 4 and 2 present. Detector types: <dt>8</dt> (same as format present, a bit=1 means a narrow angle detector).

PrintStatus	's'	Prints status information for the card, in XML format: The card mode as a number: <mo>6</mo> (for XMLCRC, see other mode numbers below) Detectors that are on: <do>8</do> Detectors that are on initially (at power-up): <di>8</di> Gain setting: <gs>1</gs> (this feature has been removed in PCB revision 4.2 and later but the firmware will still report this setting) Gain setting initial (power-up): <gi>1</gi>
SetRawMode	'r'	Mode#=0. Prints each optical character as it arrives.
SetRawDistMode	'R'	Mode#=1. Prints each optical character as it arrives. When '\r' arrives, it prints the ADC distance information before the '\r'.
SetBufferedTagMode	'b'	Mode#=2. Searches for Talking Lights ID tags of the form "\$xyyyzz". When the 8 th character including the '\$' start character arrives, the entire tag is printed to the serial port.
SetBufferedDistMode	'B'	Mode#=3. Similar to Buffered Tag but also prints the ADC value for distance.
SetXMLnoCRCMode	'x'	Mode#=4. Searches for the ID tag, and prints it completely in XML format, passing the checksum to the host PC.

SetXMLCRCMode	'X'	Mode#=6. Like XML mode, but computes the CRC and checks it to the two bytes (zz above). If they match, it prints the tag in XML format, stripping the CRC from the tag.
SetXMLnoCRCDistMode	'z'	Mode#=5. Searches for the ID tag, prints it completely in XML format, and adds ADC distance information.
SetXMLCRCDistMode	'Z'	Mode#=7. Computes the CRC and checks it to the two bytes (zz above). If they match, it prints the tag in XML format, stripping the CRC from the tag. This mode also adds the ADC distance information.
SetOffMode	'O'	Mode#=8. The default power-up state: Turn off output.
SetFreqMode	'f'	Mode#=9. Turns the card into a frequency counter for the incoming light signal. Outputs XML string with frequency in Hertz (between <fq> tags) and amplitude. Good over a range from at least 30 kHz to 175 kHz. Needs amplitude > 477 to be accurate.
SetOPT1On	'1'	Turns on photodiode 1. This photodiode does not exist on the standard card.
SetOPT1Off	'!''	Turns off photodiode 1.

SetOPT2On	'2'	Turns on photodiode 2. This optional photodiode is mounted with an upward view.
SetOPT2Off	'@'	Turns off photodiode 2.
SetOPT3On	'3'	Turns on photodiode 3. This photodiode does not exist on the standard card.
SetOPT3Off	'#'	Turns off photodiode 3.
SetOPT4On	'4'	Turns on photodiode 4. This is the standard optical receiver shown on page 7.
SetOPT4Off	'\$'	Turns off photodiode 4.
SetGainLow	'g'	Sets gain of last amplifier stage to the lower setting. This feature has been removed (unstuffed) in hardware version 4.2 and above.
SetGainHigh	'G'	Sets gain of last amplifier stage to the higher setting. This feature has been removed (unstuffed) in hardware version 4.2 and above.
UpgradeFirmware	'U'	Starts the process of installing updates. For more information about updating, contact Talking Lights Technical Support at 617-782-9300 or online at www.talking-lights.com/support

Troubleshooting

PROBLEM:

I've misplaced the CD that came with my Talking Lights Receiver.

RESOLUTION:

You can download the latest software and drivers from the Talking Lights support page at www.talking-lights.com/support.

PROBLEM:

I'm not receiving the location tag.

RESOLUTION:

- The Talking Lights Transmitter is turned off.
- The Receiver is not aimed at the light, or the light distribution pattern doesn't include the Receiver. Check to see that the green "lock" light on the Receiver is illuminated.
- The Receiver is aimed at two Talking Lights-enabled light sources.
- There is an interfering light source in the area.
- The application is not connected to the Receiver.
- The application is connected to the wrong COM port
- The transmitted checksum is incorrect.

Note: this should not happen under ordinary circumstances and can indicate a problem with the Talking Lights light source.

PROBLEM:

The green lock light is illuminated, but I'm not receiving a location tag.

RESOLUTION:

The lock light illuminates whenever the Receiver senses a light on a frequency similar to that of a Talking Lights light source. It does not indicate that valid ID tags are being decoded. If the green lock light does not illuminate this could be because:

- Light intensity is high enough to trigger lock but low enough to generate data errors.
- There may be an interfering light source.

To resolve this problem:

- Move the Receiver closer to the Talking Lights source.
- Remove any interfering light sources.

PROBLEM:

The "distance" value fluctuates.

RESOLUTION:

- Small fluctuations (± 2) are normal.
- Rotating the Receiver affects distance measurement. Because received signal strength depends on the angle of the Receiver, the amplitude of the signal changes as you move the Receiver.
- There is an interfering light source in the area.

PROBLEM:

I'm trying to view the card output using Windows Hyperterminal (or another terminal emulator). I have the baud rate and other settings correct. Why can't I see any data?

RESOLUTION:

- When you open the COM port and the system applies power to the Receiver, it starts in *Off mode*.
- To start data output, you must send a mode command to the card. The character **Z** starts the default mode, *XML mode+Range*. The character **r** starts *raw mode*, which prints every character as it is received.
- Note that the Receiver Manager application is usually easier to use than Hyperterminal, as it automatically sends the mode command to the Receiver.

How to contact Talking Lights LLC

Web:

www.talking-lights.com/support

Email:

support@talking-lights.com

Phone:

617-782-9300

Fax:

617-782-9399

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