ΩΞ OMEGA®

User's Guide

WUSB WIRELESS RECEIVER

WRS232 WIRELESS TRANSMITTER

WRS232-USB
Universal Wireless RS232 to USB Transceiver,
WRS232 Wireless Transmitter,
WUSB Wireless Receiver

ΩΕ OMEGA®

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Package Inspection

Remove the packing list and verify that you have received all your equipment. Ifyou have any questions about the shipment, please call our Customer Service Department at 1-800-622-2378 or 203-359-1660. We can also be reached on the Internet at omega.com, e-mail: cservice@omega.com

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

▼ NOTE:

The carrier will not honor any damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

The following items are supplied with the WRS232-USB product:

• Wireless Transmitter, WRS232

• Wireless Receiver, WUSB

• USB 4P(A) Male to Mini 5P(B) Male cable

• RJ12 to DB9 connector

• Configuration CD

• DB9 Female to Male adaptor

• Instruction Manua

The following items are supplied with the WRS232 product:

• Wireless Transmitter, WRS232

• RJ12 to DB9 connector

• DB9 Female to Male adaptor

• Instruction Manual

The following items are offered as optional accessories:

UNI-ADAP-9V   Universal 9 Vdc @ 1.7A adaptor (100-240 Vac input)-
                Recommended to power the wireless transmitter

WRS232-MB   Mounting Bracket with DIN Rail

NOTES:

Section 1 - Introduction

Please read this manual completely before installing and operating your wireless connector/transmitter and receiver system. It's important to read and follow all notes, cautions, warnings and safety precautions before operating this device. "Device" refers to your wireless/transmitter or receiver unit.

1.1 Precautions

• This device is not designed for use in any medical or nuclear applications.

• Do not operate this device in flammable or explosive environments.

• Never operate with a power source other than the one recommended in this manual.

• This device has been designed for dry, moisture free indoor applications only.

• Do not operate this device outside of the recommended use outlined in this manual.

• No co-location with other radio transmitters is allowed. By definition, co-location is when another radio device or it's antenna is located within 20 cm of your device and can transmit simultaneously with your unit.

• Never install the wireless transmitters/receiver within 20 cm or less from each other.

• Never install and/or operate your wireless RS232 transmitter closer than 20 cm to nearby persons.

NOTE:

There are no user serviceable parts inside your device. Attempting to repair or service your unit may void your warranty:

1.2 Safety Warnings and IEC Symbols

This device is marked with international safety and hazard symbols in accordance with IEC standards. It is important to read and follow all precautions and instructions in this manual before operating or commissioning this device as it contains important information relating to safety and EMC. Failure to follow all safety precautions may result in injury and or damage to your device. Use of this device in a manner not specified will void your warranty

IEC Symbols	Description
	Caution, refer to accompanying documentation
	EU's Waste Electrical and Electronic Equipment Compliance

Figure 1-1. IEC Symbols

1.3 Statement on FCC Marking

FCC Marking

FCC ID: OUR-XBEEPRO   IC #4214A-EXBEEPRO

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1.) This device may not cause harmful interference. 2.) This device must accept any interference received, including interference that may cause undesired operation.

Marking

It is the policy of OMEGA to comply with all worldwide safety and EMI/EMC regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the mark to every appropriate device upon certification. For additional information see Section 10 - Approvals & Regulatory Compliance.

1.4 General Description

OMEGA's new universal wireless RS232 to USB transceiver interfaces to any RS232 device, and makes it wireless. The wireless transmitter module connects to an RS232 device. The wireless receiver module connects to the PC via USB interface. The PC communicates with the RS232 device through the wireless receiver module. The wireless transmitter/receiver modules are transparent to the PC as if it is directly connected to the RS232 device.

Fig. 1-2 shows the wireless transmitter module & general dimensions. Fig. 1-3 shows the wireless receiver module & general dimensions. Fig. 1-4 shows the FCC Warning label that is affixed to the wireless transmitter/receiver modules. The transmitter/receiver module comes with two LED indicators. The green LED indicates wireless data transmission (TX). The red LED indicates wireless data reception (RX).
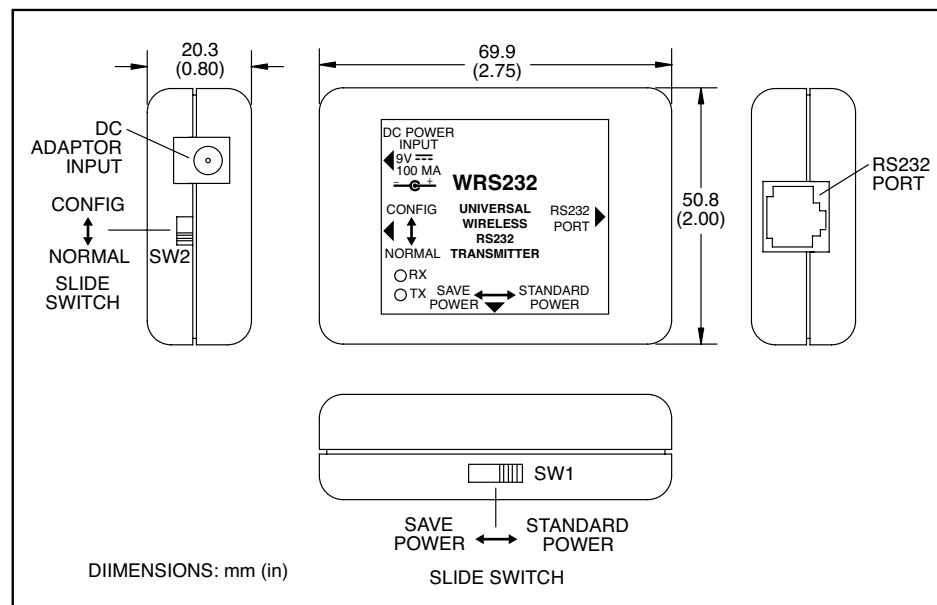
Figure 1-2 WRS232 Wireless Transmitter Module

20.3
(0.80)

69.9
(2.75)

WUSB

USB
PORT ◄

**UNIVERSAL
WIRELESS
USB
RECEIVER**

RX ○
TX ○

50.8
(2.00)

USB
PORT

DIIMENSIONS: mm (in)
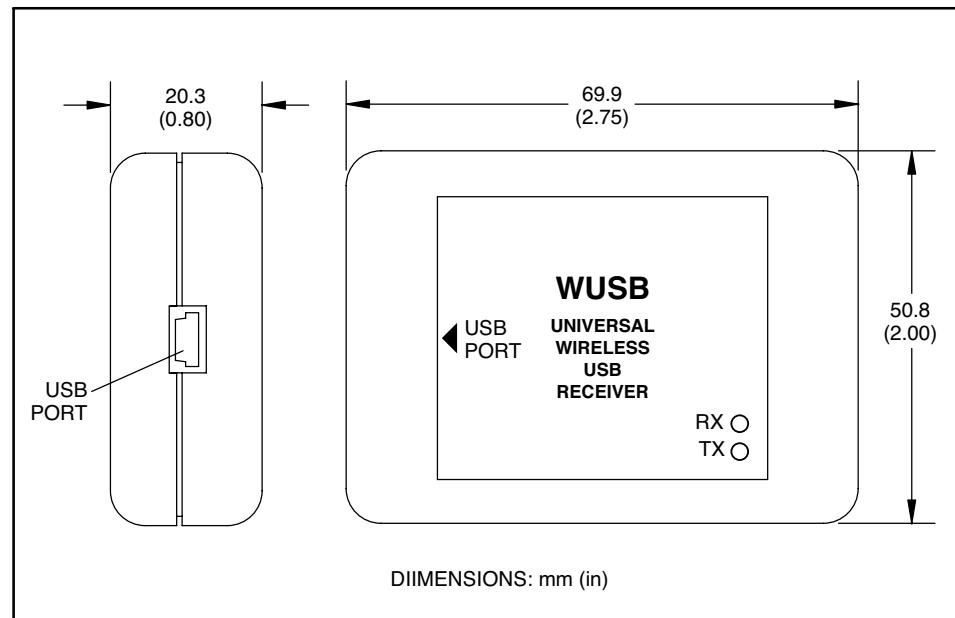
Figure 1-3 WUSB Wireless Receiver Module

FCC ID: OUR-XBEEPRO
IC #4214A-XBEEPRO

This device complies with Part 15 of
the FCC rules. Operation is subject to
the following two conditions:
1. This device may not cause harmful
interference.
2. This device must accept any
interference received, including
interference that may cause
undesired operation.

Made in U.S.A.   FC ⚠ 🗑

Figure 1-4 FCC Warning Label

2 Setup and Configuration

Connect the wireless receiver module to the PC with USB cable provided. Fig. 2-1 shows the cable connection.

Connect to PC

Connect to Wireless
Receiver Module

Figure 2-1 USB Cable Connections

2.1 USB Driver Installation

To install the USB software drivers that are required for your wireless receiver to operate correctly follow these procedures.

NOTE:

You need to have the Software CD that was supplied with your device loaded into the CD drive on your PC.

1.   Connect the wireless receiver to your computer with the USB cable provided in the box with your device. You should get a notice box that indicates that your computer "Has Found New Hardware"

2.   Your computer will then launch the Found New Hardware Wizard. Follow the instructions indicated on the Wizard boxes and the additional instructions noted in this manual.

NOTE:

After completing the Found New Hardware Wizard your system will ask that you repeat this process. This is normal. You should repeat the steps outlined here twice. After the second driver is installed you should then get the "New Hardware Ready For Use" notice.

Figure 2-2 Welcome To The Found New Hardware Wizard Screen

From this box you should check the "No, not at this time" button. Then click the "Next >" button to continue with the driver installation process.

Figure 2-3 Install Software Automatically Screen

Next, check the "Install the software automatically" button. Then click the "Next>" button to continue.

Figure 2-4 Completing The Found New Hardware Wizard Screen

This screen will be displayed to indicate that the software drivers have been installed. You should click the "Finish" button to complete the process.

2.2 Wireless Transmitter Module

The transmitter module is connected to an RS232 device with the RJ12 to DB9 connector cable provided. There are two slide switches on the unit:

SW1

• Standard Power- The RF module is powered on continuously. The transmitter module can communicate wireless at any time.

• Save Power – The RF module is powered on only when there is data activity on the RS232 port, otherwise the RF module is set to sleep mode to save power. This mode may be selected when the wireless transmitter is connected & powered by a battery powered device. While the RF module is in sleep mode, there is no wireless communication between the transmitter & receiver modules. The RF module can only be waken from the RS232 device when there is data activity.

SW2

• Normal – The slide switch should be set to Normal when the transmitter is connected to an RS232 device.

• CONFIG – The slide switch should be set to Config when the transmitter is connected to the PC for configuration.

The transmitter can be powered either directly thru the RJ12 connection by the RS232 device, or can be powered by an external 9 Vdc adaptor. The DC adaptor can be purchased as an optional accessory.

2.2.1 Mounting Bracket

The wireless transmitter/receiver can be mounted using the optional mounting bracket. Fig 2-5 shows the mounting bracket general dimensions. Fig 2-6 shows the transmitter/ receiver mounting bracket assembly. In order to assemble the mounting bracket to the module, the two case module screws are used. Fig 2-7 shows the transmitter mounting bracket assembly with a 1/4-20 screw for tripod mounting. Fig 2-8 shows the transmitter mounting bracket assembly with a DIN rail.

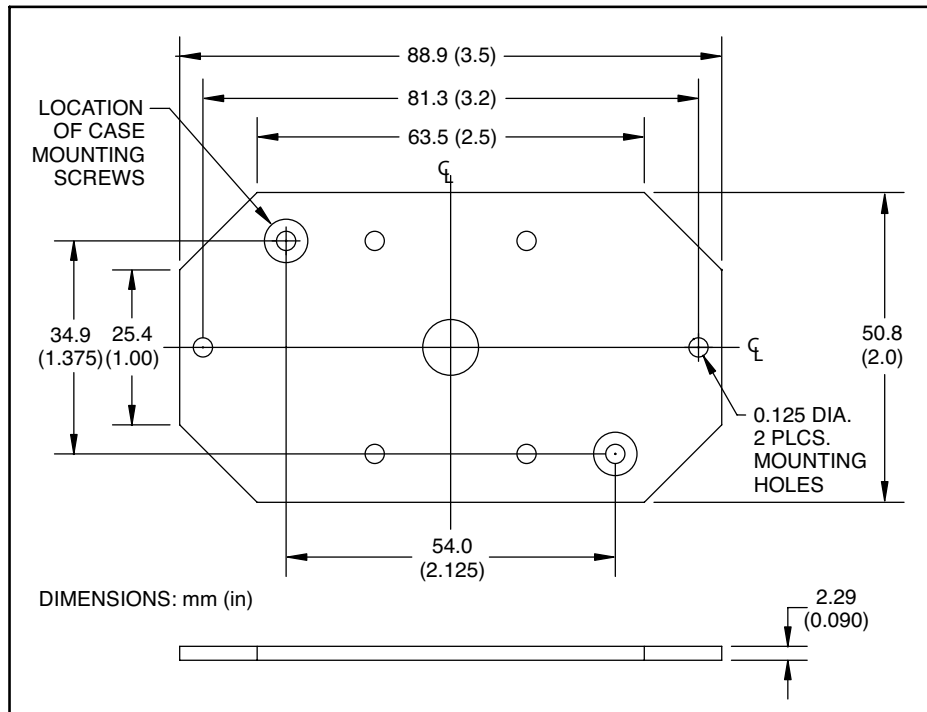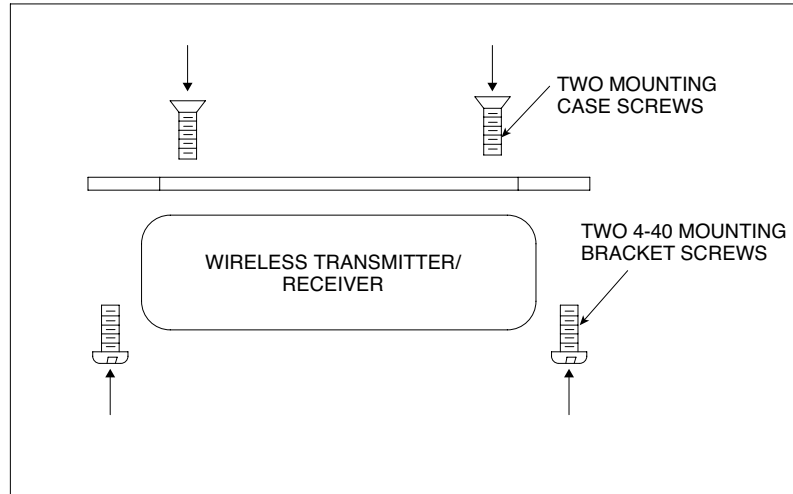**Figure 2-5 General Dimensions - Mounting Bracket**

Figure 2-6 Transmitter Mounting Bracket Assembly

Figure 2-7 Transmitter Bracket With 1/4-20 Mounting Screw For Tripod Mount
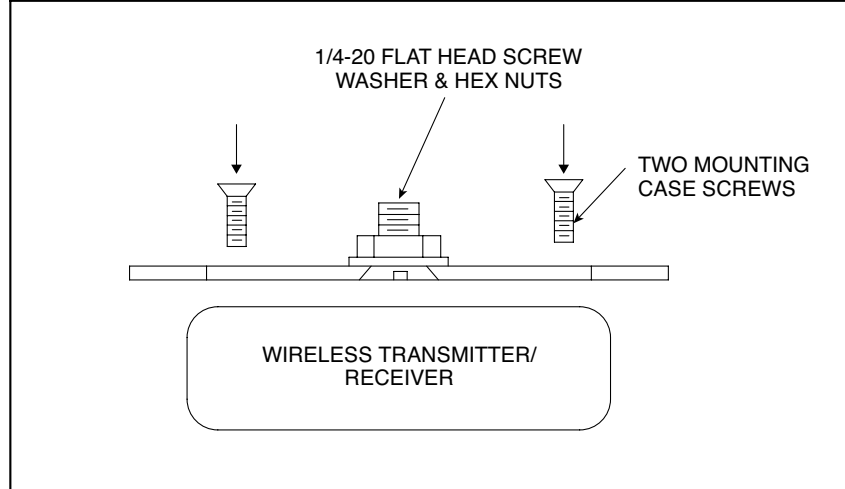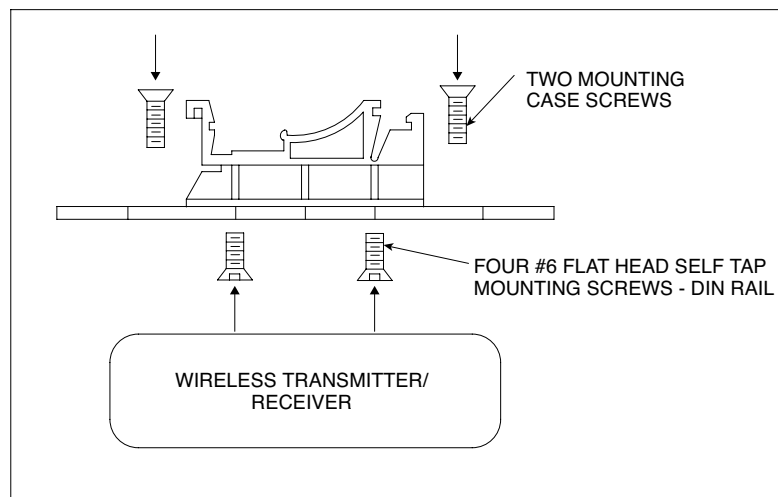

Figure 2-8 Transmitter Mounting With DIN Rail Mount Assembly

When mounting your wireless transmitter, care should be taken to make sure it is as far away from any metal objects. Otherwise, it has the potential to interfere with the way the unit radiates and may cause signal lose or possibly even the inability to communicate at all with your receiver.

When installing your wireless transmitter it is important to position your device in such a way as to optimize the antenna location within what's known as the "Fresnel Zone".

The Fresnel Zone can be thought of as a football-shaped invisible tunnel between two locations that provides a path for RF signals between your transmitter and receiver.
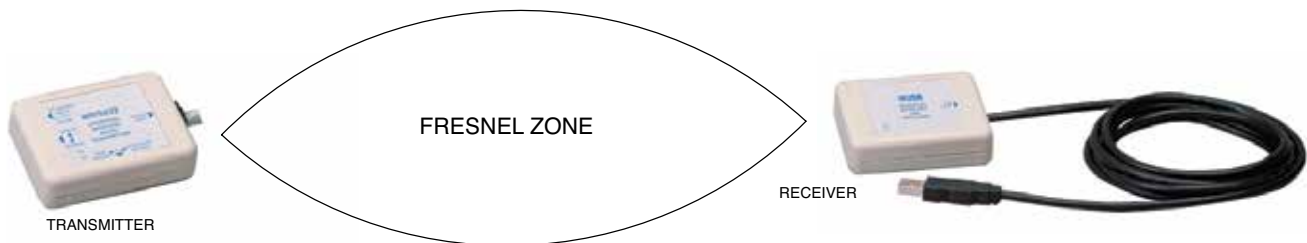

FRESNEL ZONE

TRANSMITTER

RECEIVER

Figure 2-9 Fresnel Zone

In order to achieve maximum range, the football-shaped path in which radio waves travel must be free of all obstructions. Obstacles in the path (especially metal) will decrease the communication range between your transmitter and receiver. Also, Transmission over half of the Fresnel zone ends up being obstructed by the earth resulting in significant reduction in range. To avoid this problem, the transmitter should be mounted high enough off of the ground so that the earth does not interfere with the central diameter of the Fresnel zone.

NOTE:

It is important to understand that the environment may change over time due to new equipment or machinery being installed, building construction, etc. If new obstacles exist between your transmitter and receiver, the devices can be raised on one end or on both ends to hopefully clear the Fresnel Zone of obstructions.

NOTE:

No co-location with other radio transmitters is allowed. By definition, co-location is when another radio device or it's antenna is located within 20 cm of your receiver/transmitter and can transmit simultaneously with your unit.

NOTE:

Never install the WRS232 wireless transmitters within 20 cm or less from each other.

3 – Transmitter/Receiver Configuration

The Configuration CD comes with a Wizard software which allows the user to read or change the configuration of the transmitter/receiver. You need to install the software by following the menus. Once the wizard software is installed, you can configure the transmitter (Thru RS232 connection) or receiver (Thru USB connection) from the PC software.

Your PC should meet the following minimum requirements in order to install and operate the wizard software:

- • Windows 2000, XP, or Vista

- • 200 MB of Hard drive

- • 256 MB of RAM

- • 1 CD ROM drive

- • One USB and one RS232 port

The factory default settings for the transmitter/ receiver modules are:

Baud Rate: 9600 BPS

Channel No. = 1

You can change the baud rate and/ or the channel number for the transmitter/ receiver using the wizard software. The baud rate and channel number for the transmitter should always match the receiver settings, otherwise the two modules will not communicate.

The Baud rate can be set to anywhere from 1200 to 230,400 BPS. The Channel number can be set to channels 1 thru 12.

3-1 Multiple Transmitters

When using one transmitter with one receiver, there is no need to change the channel number. However, one receiver can communicate with multiple transmitters (Up to 12) one at a time by changing the channel number of the receiver module to match the transmitter module. So if there are five transmitters, they should be configured to Channels 1 thru 5.

Transmitter #1 set to Channel 1

Transmitter #2 set to Channel 2

Transmitter #5 set to Channel 5

Then the receiver can be set to channel 1 to communicate with transmitter #1, or channel 2 to communicate with transmitter #2, and so on and so forth.

3.2 Environment/Operating Conditions

The wireless transmitter and receiver modules have been designed to be operated in a clean and dry indoor environment. Care should be taken to prevent the components of your wireless system from being exposed to moisture, toxic chemicals and extreme cold or hot temperature that are outside the specifications listed in this manual.

3.2.1 Operating Conditions

The following is a list of basic good practice you should apply when operating your wireless system.

- Never operate your wireless device outside the recommended environmental limits specified in this manual.

- Never operate your wireless device in flammable or explosive environments.

- Never use your wireless device in medical, nuclear or other other dangerous applications were failure can cause damage or harm.

- No co-location with other radio transmitters is allowed. By definition, co-location is when another radio device or it's antenna is located within 20 cm of your transmitter and can transmit simultaneously with your unit.

- Never install receiver/transmitters within 20 cm or less from each other.

- Never install and/or operate your transmitter/receiver closer than 20 cm to nearby persons.

3.3 Determining and Maximizing Range

NOTE:

> The available maximum range specified for this wireless system is only achievable under optimum installation conditions. Mounting height, obstructions in your "Fresnel Zone" and ambient conditions can affect the signal strength resulting in a shorter range between your transmitter and receiver unit.

The following recommendations will help to improve the range of your wireless system.

Position your receiver in a central location

When multiple transmitters are in operation, position your receiver unit in a central space if possible in equal distance to each wireless transmitter.
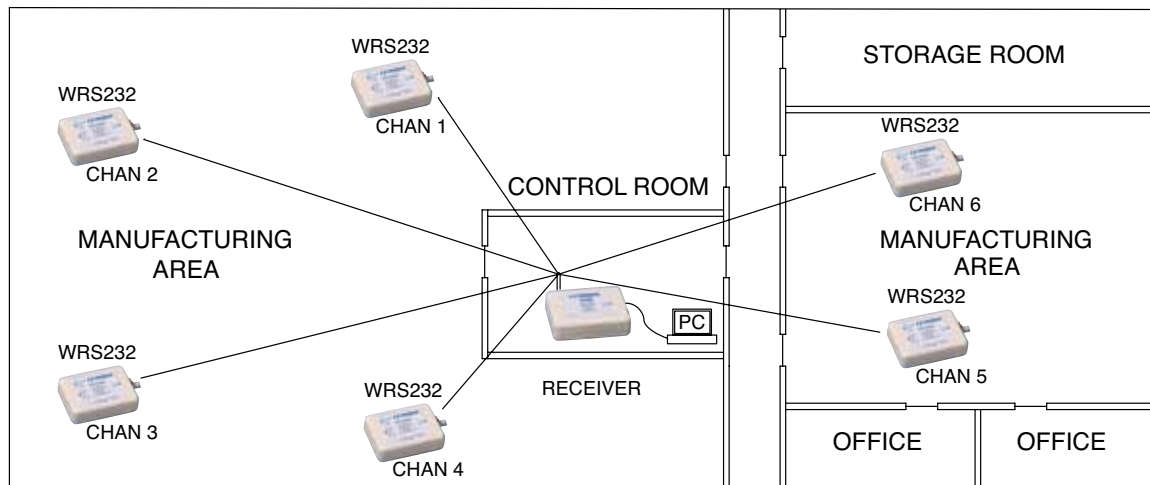

Figure 3-1 Determining Maximum Range

Test your system before permanent mounting

Before permanently mounting your transmitters in your application try moving the devices to different locations and mounting angles to determine what installation achieves the best signal strength.

Move your system components higher off the floor and away from exterior walls

Avoid installing your system components too close to the floor or near your buildings exterior walls. The closer your transmitter and receiver unit are the greater the interference and lose of signal strength will be.

Maintain a line of sight (LOS) between transmitter/receiver

Maintaining a clear line of sight between your transmitter and receiver unit will produce improved signal strength over a system that has obstacles blocking it.

Maintain a constant ambient temperature environment

Maintaining a constant ambient temperature environment is important to achieving maximum signal strength. Exposing your system components to extreme hot or cold temperatures, or sudden changes in ambient conditions will have an effect on the performance of your system.

3.4 Operation in Buildings

The Wireless Transmitter sends wireless data transmissions to a receiver connected to your PC. Radio signals are electromagnetic waves. A radio signal becomes weaker the further it travels. Range is decreased by different types of materials found in the direction of the signals propagation. Radio waves can penetrate most types of wall materials, but they are dampened more than they would be by a direct line-of-sight installation.

3.5 Building Materials

Examples of how different types of wall material may reduce your signal:

Material Type	Possible Signal Reduction
Wood, Plaster, Sheetrock, Uncoated Glass w/o Metal, Fiberglass	0 to 10%
Brick, Pressboard	5 to 35%
Reinforced Concrete	10 to 90%
Metal Walls, Metal Doors, Elevators, Metal Stair Cases, Metal Piping, Metal Mesh, Metal Screening	90 to 100%

Figure 3-2 Operation In Buildings

Avoid dampening materials by repositioning the transmitting and/or receiver.

3.6. Penetration Angle of Radio Waves through Walls

The angle at which the transmitted radio signal hits a wall is very important and also has a big effect on maximizing range. Signals between your transmitter should be transmitted as directly as possible.

Section 4 – Specifications

Wireless Transmitter, WRS232

Operating Ambient conditions	0 to 50ºC (32 to 122ºF) 0 to 95% Relative Humidity (Non-Condensing)
Device interface	RS232
RS232 Cable	RJ12 to DB9 connector (Female)

RJ12 Pin #	DB9 Pin #
Normal (Config)	
3 RX (TX)	2 RX
4 TX (RX)	3 TX
5 GND	5 GND
1 Power	---

RS232 communication	9600 BPS, 8 Bits of Data, 1 Stop Bit, No Parity
RF Transmitter carrier	ISM 2.4 GHz, Direct sequence spread spectrum, License free world wide
RF Data Packet Standard	IEEE 802.15.4 open communication architecture
RF Output Power	10 dBm (10 mW)
RF Range	Up to 40 m (130') indoor/urban Up to 120 m (400') outdoor/line of sight
Supply Voltage	External 9 Vdc, or Powered thru RJ12 connection
Supply Current	60 mA
AC adapter	100-240 Vac, 50-60 Hz, UL, FCC marked
Output Voltage **Output Plug (Female)**	9 Vdc @ 1.7A Center positive, coax 2.0/5.5/10 mm
Enclosure	ABS Plastic, Bone color
Dimensions	70 x 51 x 20 mm (2.75 x 2 x 0.80")
Weight	60 g

Wireless Receiver, WUSB

PC interface	USB 1.1, USB 2.0 compatible
Power	USB bus +5V powered, 300 mA max.
Cable Type	USB 4P(A) Male to Mini 5P(B) Male, 1.8 m (6') Long
Operating Ambient Conditions	0 to 50ºC (32 to 122ºF), 0-95% Relative Humidity (Non-condensing)
Enclosure	ABS Plastic, Bone color
Dimensions	70 x 51 x 20 mm (2.75 x 2 x 0.80")
Weight	60 g

Approvals, Regulatory Compliance & Patent Notice

FCC (Domestic Use: USA & Canada)

(USA) FCC ID: OUR-XBEEPRO   (CANADA) IC #4214A-EXBEEPRO

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1.) This device may not cause harmful interference. 2.) This device must accept any interference received, including interference that may cause undesired operation.

▼ WARNING:

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended. This transmitter must not be co-located in conjunction with any other transmitter or antenna.

NOTES:

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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- Pumps & Tubing
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- Industrial Water & Wastewater Treatment
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M4588/0308