WSC 100 User's Manual

Rev. A, January 2003

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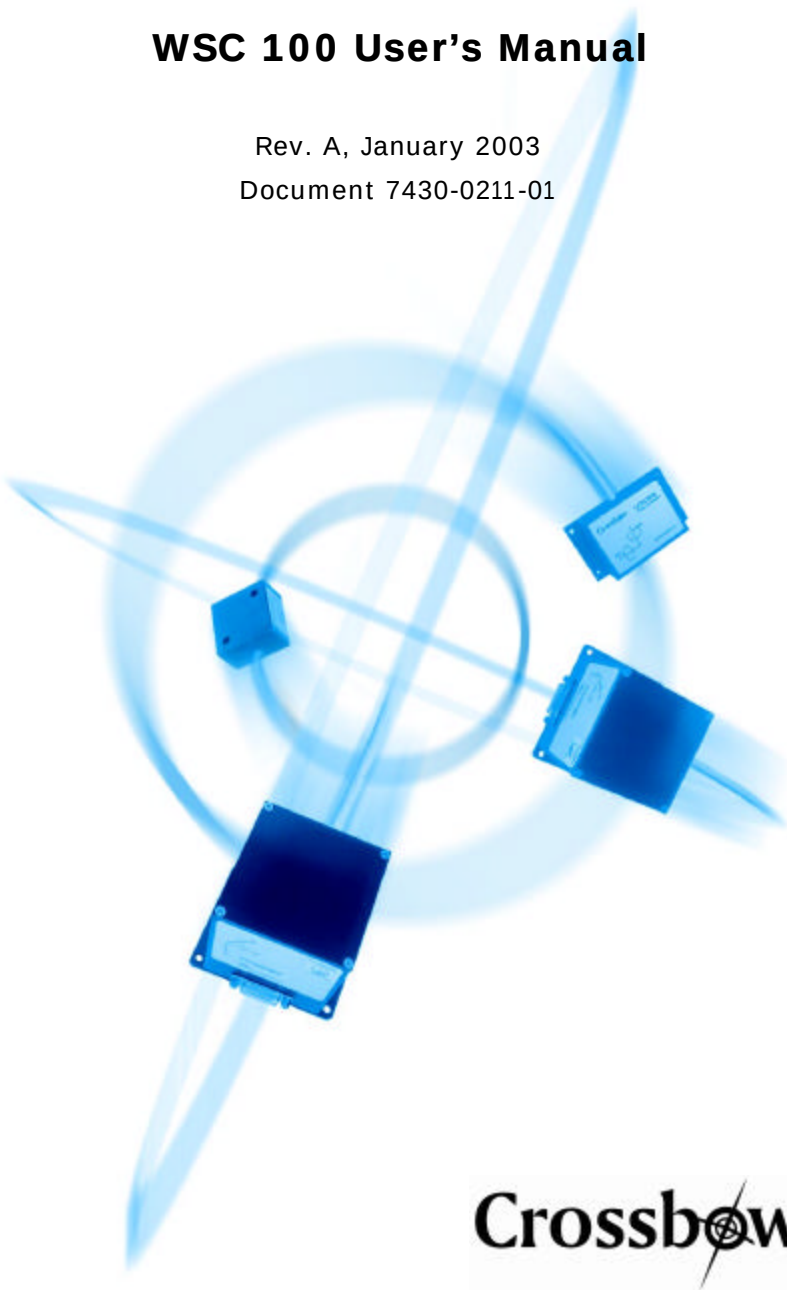

Crossbow

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1 Introduction

The WSC100 is a wireless replacement for analog sensor cabling. It provides a radio connection for 0-5V analog signals. Each WSC100 module can support the connection of up to four 0-5V analog channels. The WSC100 consists of two modules - a Transmitter and Analog-to-Digital (A-D) converter unit as well as a Receiver and Digital-to-Analog (D-A) Converter unit. The WSC100 modules attempt auto-connect to each other immediately upon power-up and two LEDs indicate connection status. The radios communicate using 2.4GHz and a frequency hopping spread spectrum (FHSS) scheme. The 2.4GHz band allows for unlicensed usage worldwide, and the FHSS technology allows multiple WSC100 pairs to work in the same area without interference.

1.1 WSC100 Components

The WSC100 package contains all the components that required to get started. The contents of the package include:

- WSC100 A-D Module
- WSC100 D-A Module
- 2 RJ-45 3' Category-5Cables
- 2 RJ-45 External Connection Blocks
- 1 User's Manual

1.2 Connections

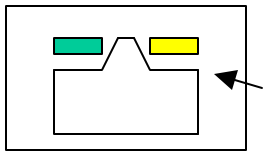
Signals are connected to the WSC100 via the Screw Terminal Post on the front of the unit or the RJ-45 connector in the rear of the unit. The RJ-45 connector can be used with standard Cat 5 cable. For your convenience we have included a RJ-45 Cable as well as a terminal block that breaks out the cable connections.

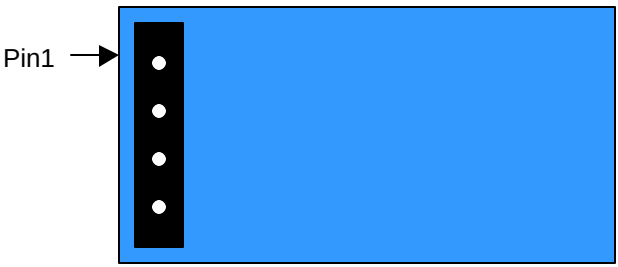
RJ-45 Pin Connection Table

1	Power (6-9VDC)
3	Analog Input Channel 3
4	Analog Input Channel 4
5	Ground

4-Post Screw Terminal Table

1	Power (6-9VDC)
2	Analog Input Channel 2
3	Analog Input Channel 1
4	Ground





NOTE

5V power (5-5.5VDC) can be used instead of 6VDC for analog power in; however, for best accuracy use 6-9VDC for power. Each WSC100 module has a built in low-dropout voltage regulator. The use of 5V power, bypasses the low-dropout voltage regulator, and hence the A-D and D-A reference will be directly connected to 5V power signal.

WARNING

Never connect signals that are greater than 5.2V or less than –0.2V to the analog input channels on a transmitter or to the analog output channels on a receiver.

1.3 Lights

The LEDs built into the RJ-45 Connector are used for indicating status information. The blinking sequence of the two LEDs are used to tell you the status of the modules and if the radio connectivity is good.

1.3.1 Power-Up and Search Sequence

At power up, the two-modules begin a search process. The search process continues indefinitely until a connection is made. During the search process, the Transmitter A/D module blinks yellow. The Receiver D/A module blinks an alternate yellow and green flashing sequence.

1.3.2 Connection Established

Once a connection is established, both WSC100 modules will flash yellow and green at high speed. If you look closely, you will notice that the green LED flashes four times faster than the yellow LED. The green LED flashes each time a good analog value is transmitted or received. The yellow LED flashes each time an acknowledgement byte is transmitted or received. There is one acknowledgement byte for each set of the four analog values.

1.3.3 Module Failure

If the module has failed an internal check, the green LED will flash quickly.

2 Using WSC100 with Analog Signals

The WSC100 replaces an analog cable with digital wireless communications. This section reviews some considerations for connecting analog signals to the WSC100. These considerations will allow the WSC100 to be as transparent a replacement to the analog signal as possible.

2.1 Connecting to the Transmitter Module and A-D

Up to four analog signals connect into Transmitter / A-D converter module. The A-D has greater than 12bits of resolution. The A-D input is high impedance, so connect sensors should generally be simple. The analog-input range is 0-5VDC. There is some slight accuracy degradation between 4.95-5.0V. If this analog range is particularly important, then it is recommended to uses a divider network between the channel and ground in order to avoid the 4.95-5.0V range.

2.2 Connecting to the Receiver and D-A

A Digital Analog Converter with output voltage range of 0-5V drives the analog output channels of the WSC100 receiver module. The analog-input range is 0-5VDC and has 12 bit resolution. There is some slight signal degradation between 4.95-5.0V. See Section 2.1. The analog outputs are capable of driving up to 20mA into a resistive loads. For loads larger than 20mA, an external buffer must be used.

NOTE

The D-A has steps in the output when it is updates. These step changes are generally small if the input signal is low-frequency and smooth. However, if the signal is more dynamic the step changes may become more apparent. In this case the addition of an Resistor Capacitor filter on the output of the D-A module

WARNING

Never connect signals that are greater than 5.2V or less than –0.2V to the analog input channels on a transmitter or to the analog output channels on a receiver.

2.3 Resolution

The resolution of the overall system is 12 bits. This equates to a 1-bit step size of 1.22mV.

2.4 Accuracy

The absolute voltage accuracy measure how precise a signal is replicated in absolute voltage from the Transmitter to the Receiver module. Errors that contribute to in accuracy include mismatches in the voltage reference between the Transmitter and Receiver's A-D and D-A, non-linearities in the A-D and D-A, as well as Temperature coefficients of the A-D and D-A. The typical absolute accuracy is better than 20mV over the range of 0-4.95V.

3 Warranty and Support Information

3.1 Customer Service

As a Crossbow Technology customer you have access to product support services, which include:

- Single-point return service
- Web-based support service
- Same day troubleshooting assistance
- Worldwide Crossbow representation
- Onsite and factory training available
- Preventative maintenance and repair programs
- Installation assistance available

3.2 Contact Directory

United States:	Phone:	1-408-965-3300 (7 AM to 7 PM PST)
	Fax:	1-408-324-4840 (24 hours)
	Email:	techsupport@xbow.com
Non-U.S.:	refer to website	www.xbow.com

3.3 Return Procedure

3.3.1 Authorization

Before returning any equipment, please contact Crossbow to obtain a Returned Material Authorization number (RMA).

Be ready to provide the following information when requesting a RMA:

- Name
- Address
- Telephone, Fax, Email
- Equipment Model Number
- Equipment Serial Number
- Installation Date
- Failure Date
- Fault Description

3.3.2 Identification and Protection

If the equipment is to be shipped to Crossbow for service or repair, please attach a tag TO THE EQUIPMENT, as well as the shipping container(s), identifying the owner. Also indicate the service or repair required, the problems encountered, and other information considered valuable to the service facility such as the list of information provided to request the RMA number.

Place the equipment in the original shipping container(s), making sure there is adequate packing around all sides of the equipment. If the original shipping containers were discarded, use heavy boxes with adequate padding and protection.

3.3.3 Sealing the Container

Seal the shipping container(s) with heavy tape or metal bands strong enough to handle the weight of the equipment and the container.

3.3.4 Marking

Please write the words, "***FRAGILE, DELICATE INSTRUMENT***" in several places on the outside of the shipping container(s). In all correspondence, please refer to the equipment by the model number, the serial number, and the RMA number.

3.3.5 Return Shipping Address

Use the following address for all returned products:

Crossbow Technology, Inc.
41 E. Daggett Drive
San Jose, CA 95134
Attn: RMA Number (XXXX)

3.4 Warranty

The Crossbow product warranty is one year from date of shipment.

Crossbow Technology, Inc.
41 Daggett Drive
San Jose, CA 95134
Phone: 408.965.3300
Fax: 408.324.4840
Email: info@xbow.com
Website: www.xbow.com

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