Control Microsystems Bluetooth User Manual

Model 5913 Bluetooth Adaptor, type RJ-45 (Controller)
Model 5914 USB (PC) Bluetooth

CONTROL MICROSYSTEMS

SCADA products... for the distance

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5913 and 5914 User and Reference Manual

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Trademarks

Table of Contents

1 Overview

Bluetooth is a global standard communications method that enables data to be exchanged wirelessly between electronic devices. The products described in this user manual, the 5913 *Bluetooth* adaptor and the 5914 USB *Bluetooth*, are designed to provide wireless connection between SCADAPack controllers and PCs. This wireless connection replaces direct serial connections which are difficult to create in many field installations.

The 5913 connects directly to a serial port on a SCADAPack controller using one of the two serial cables that are available. Operating power for the 5913 is provided by the serial port on the SCADAPack controller. The 5913 is shipped from the factory as a discoverable *Bluetooth* slave device.

The 5914 is a Universal Serial Bus (USB) Bluetooth transceiver. Operating power is provided through the USB interface. The 5914 is shipped with a CD containing the Bluetooth USB Adapter Software Driver. The 5914 connects to a PC or laptop and operates as a Bluetooth master when communicating with the 5913.

While this user manual describes the configuration and operation of 5913 in conjunction with the 5914, the 5913 may be used with any compatible Bluetooth device, such as an internal Bluetooth transceiver on a PC or laptop.

The features of the 5913 include:

- Wireless communications module certified to Bluetooth® ver2.0.
- Integrated software stack, profiles, and AT modem like commands.
- The 5913 can be configured and controlled through simple ASCII strings over the Bluetooth RF link.
- Serial port (UART) baud rate speeds: 1200bps up to 921.6Kbps.
- Bluetooth Class 1: +100 meter (330 feet) distance.
- Software adjustable transmitter power from short to long range applications
- Secure and robust communication link. FHSS (Frequency Hopping Spread Spectrum), encryption and 16 alphanumeric Personal Identification Number (PIN) and error correction schemes for guaranteed packet delivery.

Note:	The 5913 Bluetooth adaptor requires 5VDC for operation. The SCADAPack controller supplies this voltage through the serial port. This requirement prohibits the Bluetooth adaptors from being used with SCADASense transmitters or any device that does not supply the 5VDC through the serial port.

2 Important Safety Information

Power, input and output (i/o) wiring must be in accordance with Class I, Division 2 wiring methods Article 501-4 (b) of the National Electrical Code, NFPA 70 for installations in the U.S., or as specified in Section 18-1J2 of the Canadian Electrical Code for installations within Canada and in accordance with the authority having jurisdiction.

WARNING !
EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2.

WARNING !
EXPLOSION HAZARD – WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES.

WARNING !
EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

3 Quick Start Guide

This section of the manual will lead you through the steps necessary to establish a Bluetooth connection between your PC and a target controller. PC applications such as RealFLO, TelePACE and ISaGRAF will then be able to use the Bluetooth connection in a similar manner as a direct serial connection.

Note: If you are using a laptop with a built in Bluetooth adapter you do not need to install the 5914 USB Adapter software driver.

The Quick Start procedure includes the following items:

- Install 5913 module at the SCADAPack.
- Install 5914 USB.
- Install 5914 USB Adapter Software Driver.
- Establish *Bluetooth* Connection between 5913 and 5914.
- Establish *Bluetooth* Connection using internal Bluetooth on laptop.
- Configure applications such as TelePACE and RealFLO to use the *Bluetooth* connection.

3.1 Install 5913 Serial Adaptor

The installation of the 5913 involves making a serial cable connection to a SCADAPack controller. There are two types of serial connector used on SCADAPack products RJ-45 and DE9S. Both serial cable types are shipped with the 5913. For further details on the cables and SCADAPack controller serial ports see section ***4.1 5913 Installation.***

3.2 Install 5914 USB Adaptor

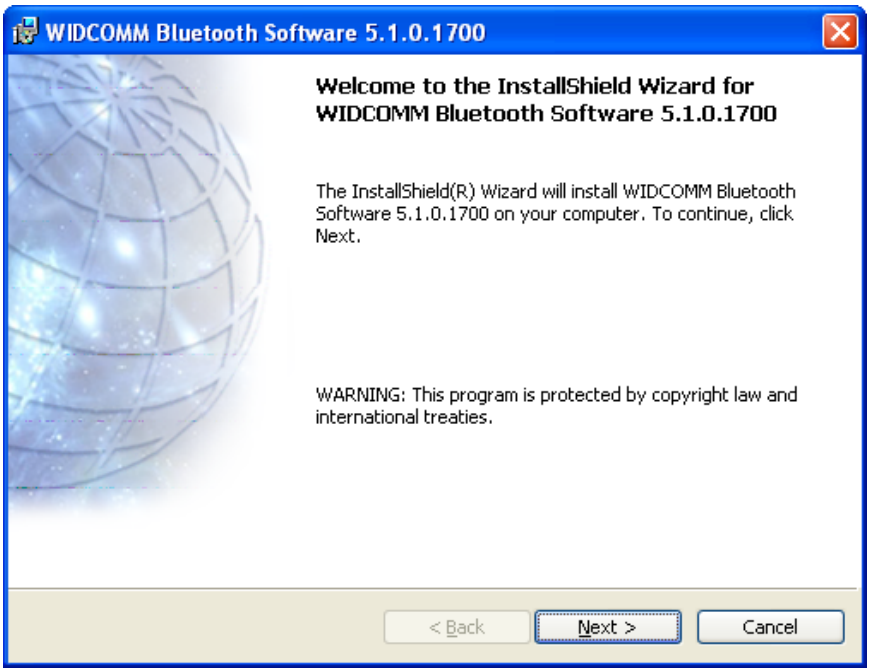
The 5914 (USB) is installed by plugging the unit into an available USB slot on your PC. When properly connected to a USB port the blue indicator led on the 5914 USB *Bluetooth* will be on.

3.3 Install 5914 USB Adapter Software Driver

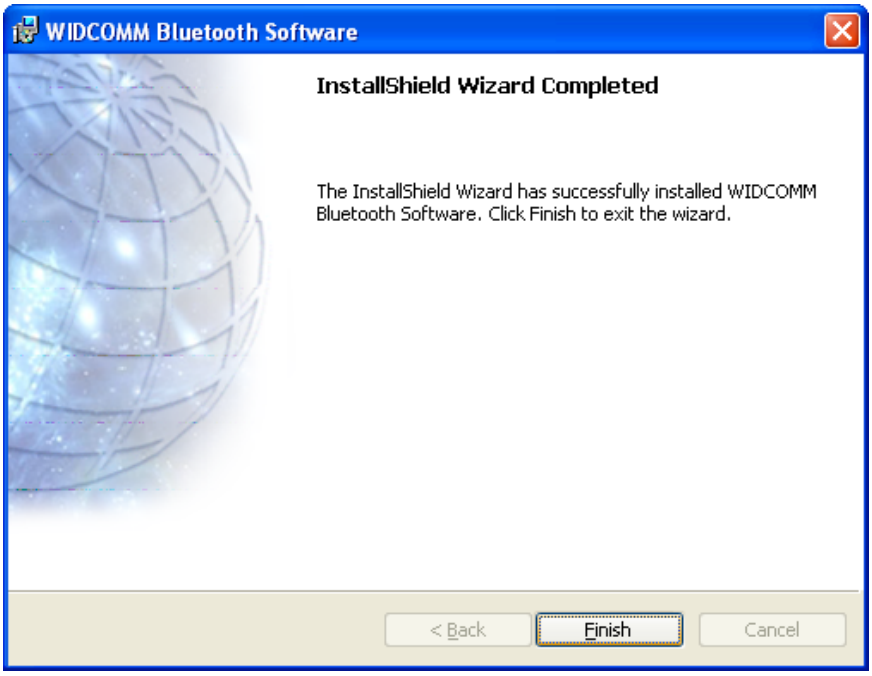
The software driver is installed from the CD ROM that came with the 5914. This CD contains the WIDCOMM Bluetooth Software. The installation will automatically start and open the Setup Program splash screen.

Note: The 5914 is **NOT** supported on Windows Server 2003 operating system.

- Click the *Next* button to start the Installation Wizard. The Installation Wizard will guide you through the installation.



- The Bluetooth configuration is now complete. You may click *Finished* and begin to discover the available devices.



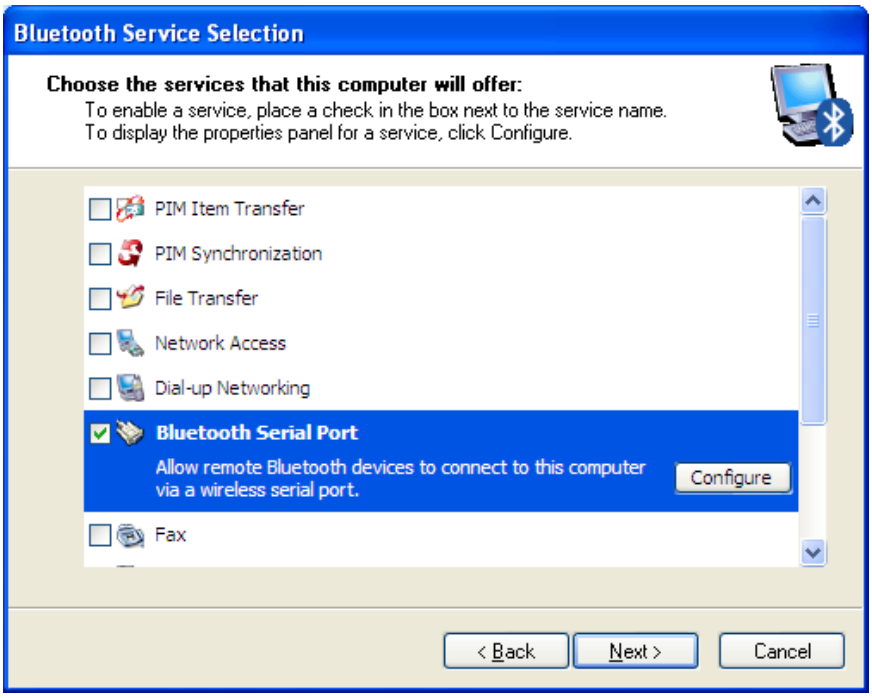
3.4 Configure *Bluetooth* Connection

The *My Bluetooth Places - Bluetooth Neighborhood* can be located in the Windows **Start** >> **All Programs** >> ***My Bluetooth Places***.

The available devices will automatically discover in the Entire Bluetooth Neighborhood. The serial number of the 5913 Serial Adapter is displayed as the device name. (The adapters listed will be the *Bluetooth* devices within range, approximately 300 feet.)

- Click the Next button to begin the Initial Bluetooth Configuration Wizard. The Configuration Wizard will guide you through the configuration process.

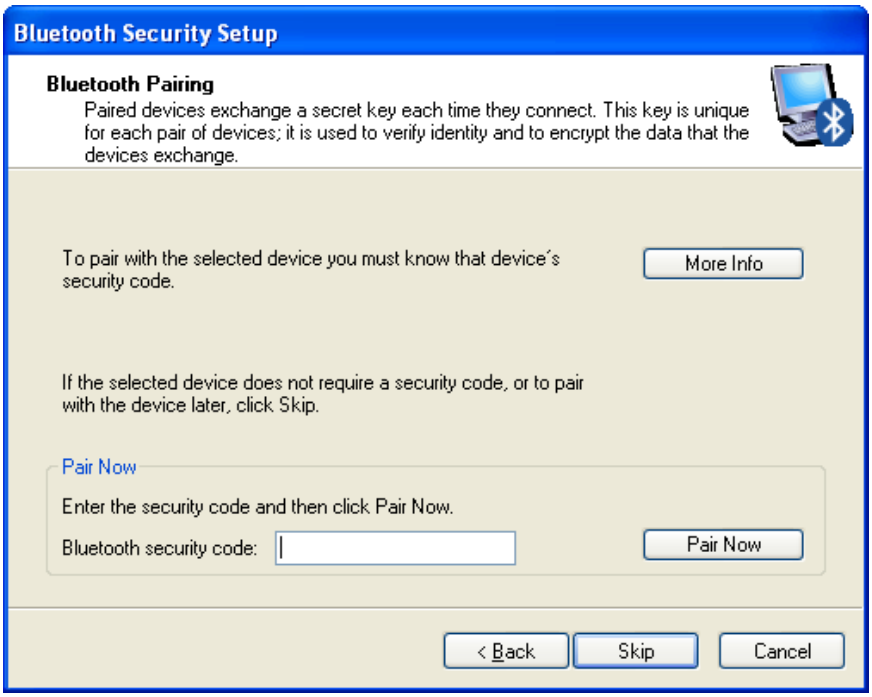
- When prompted with the Bluetooth Service Selection, you must select Bluetooth Serial Port to allow remote Bluetooth devices to connect to the computer.



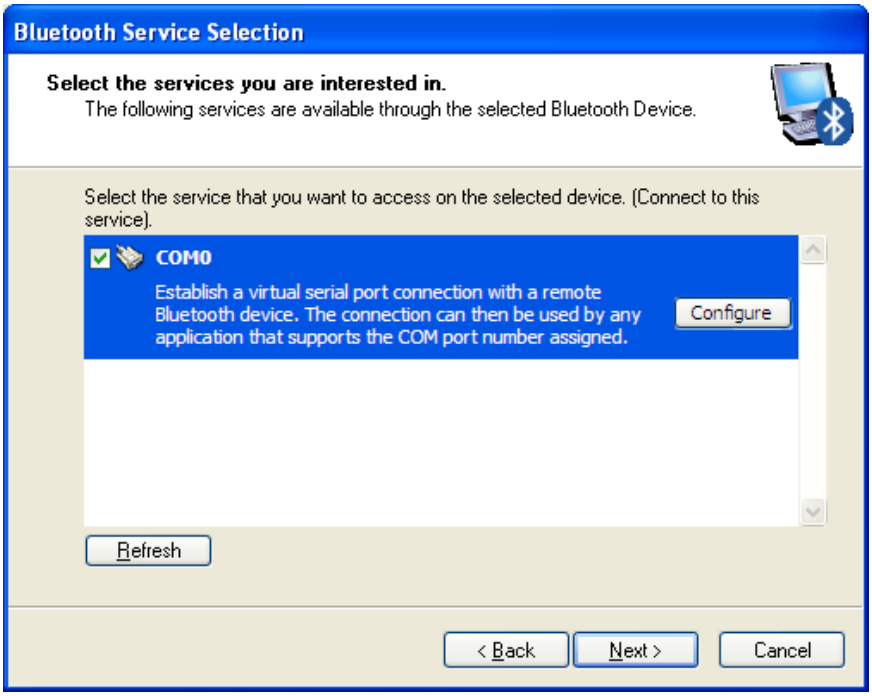
- Click the *Next* button to configure any active Bluetooth devices or click the *Skip* button to setup the connections later.

- Select the device you would like to configure and click the *Next* button.

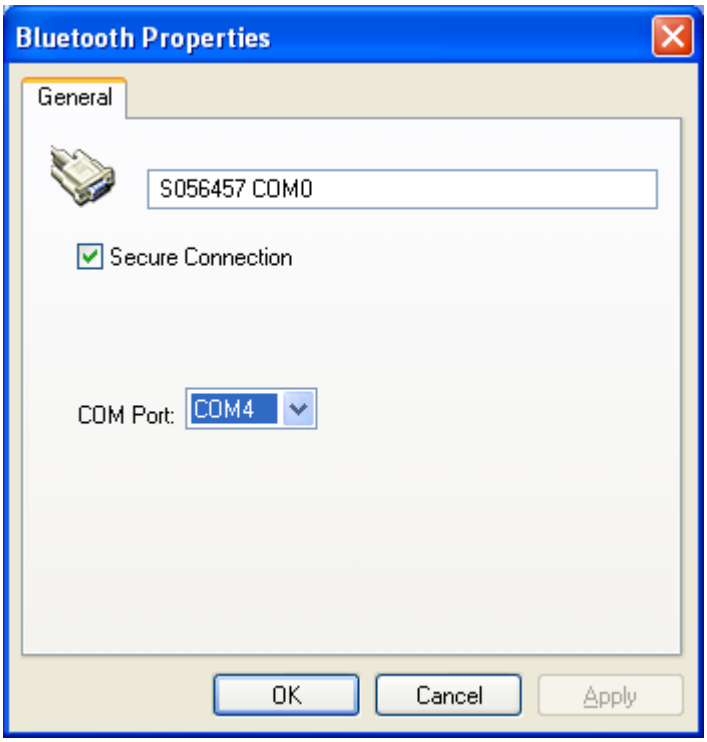
- Enter the Bluetooth security code and click the *Pair Now* button. (Security Code: **default**)



- Select the virtual serial connection and click the *Configure* button.

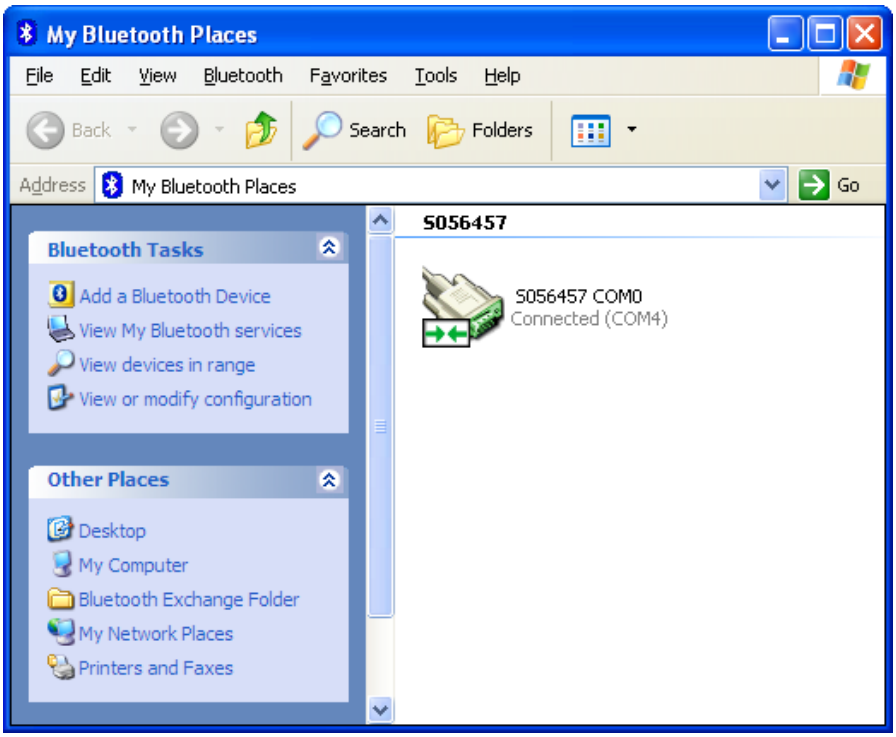


- The COM Port selected will be the virtual serial connection on the computer. Note that this is the port you will need to select when setting the **PC Communication Settings** in your application.



- Click the *Finish* button to complete the Bluetooth Setup wizard.

- The *Bluetooth* connection is now ready for applications.

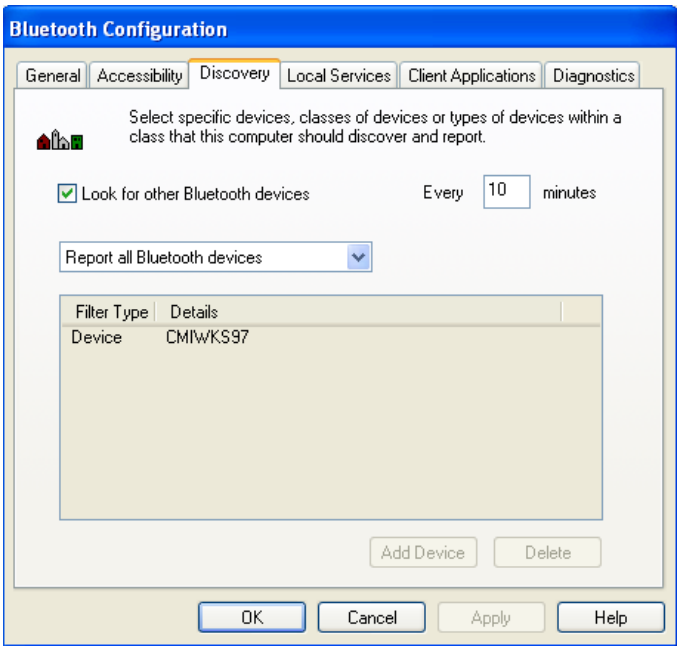


3.5 Configure Internal Laptop *Bluetooth* Connection

If your laptop or PC has an internal *Bluetooth* adapter you can use it to establish a *Bluetooth* connection with the 5913. Refer to your user manual for details on establishing a *Bluetooth* connection.

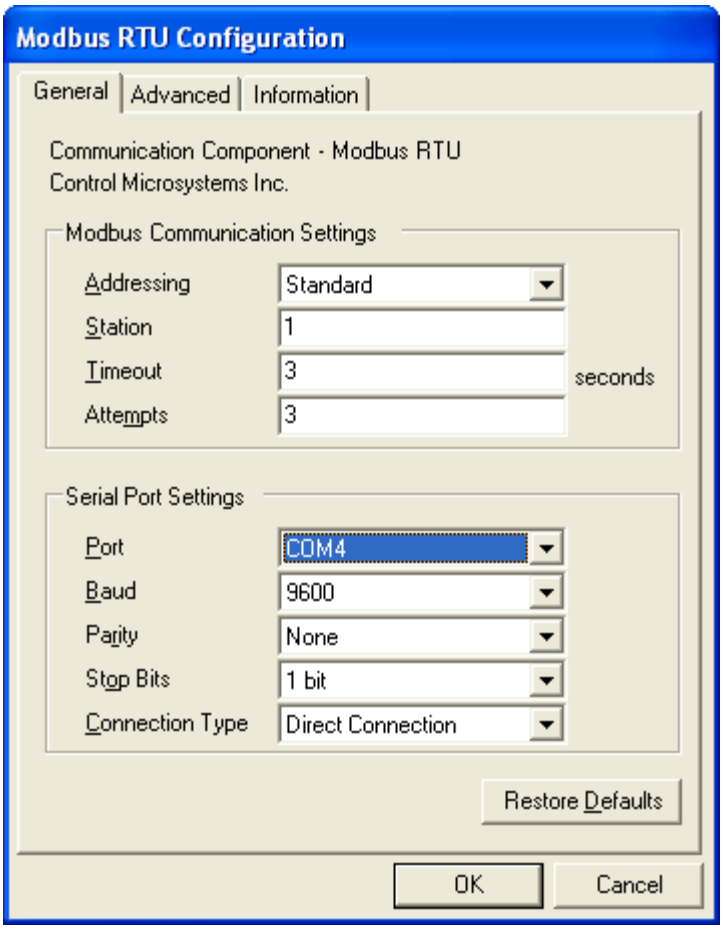
Note	If the 5913 is used with a laptop using a built-in class 2 *Bluetooth* device, the range will be limited by the class 2 device (approximately 3m or 10 ft.)

The internal Bluetooth may not be set up for automatic discovery. This needs to be enabled in your configuration software. An example of the correct setting is shown in the figure below.



3.6 Configure application

All Control Microsystems software applications may be configured to use a *Bluetooth* connection to communicate with a target SCADAPack controller. Communication parameters for the communication link between a PC and A SCADAPack controller are set using the PC Communication Setting dialog. The PC Communication dialog for RealFLO is shown below.



The factory default serial settings for the 5913 are 9600 baud, 8 data bits, no parity and 1 stop bit. COM4 is the virtual serial port created during the installation of the 5914 USB software driver.

Note	*Bluetooth* connections will be disconnected if an attempt to create a New Connection is made when the 5913 is connected.

4 Installation

4.1 5913 Installation

The installation of the 5913 involves making a serial connection to a SCADAPack controller. The 5913 has a single RJ-45 serial connector as shown in ***Figure 2: 5913***. Depending on the SCADAPack controller you are connecting to use one of the two serial cables available to connect the 5913 to the SCADAPack.

Note:	The 5913 is supplied with serial cable RJ-45 to RJ-45 (CMI part number 297303). Cable RJ-45 to DE9S (CMI part number 297304) may be ordered separately. These cables are two feet long and must not be substituted with longer cables. Longer cables have the potential to introduce noise on the serial port and result in very poor communications.

The 5913 is powered through the serial port when connected to a SCADAPack controller. The connection description for SCADAPack controllers and integrated I/O boards are listed below:

SCADAPack and Micro16 Controllers

- The 5913 may be connected to RS-232 ports COM1 or COM2.
- Use the RJ-45 to DE9S cable (part number 297304).

SCADAPack LP

- When connecting to COM 2 on the SCADAPack LP jumper J13 must be connected.
- The 5913 may be connected to COM3.
- Use the RJ-45 to RJ-45 cable (part number 297303).

SCADAPack 100

- When connecting to COM1 on the SCADAPack 100 jumper J5 must be connected.
- When connecting to COM2 on the SCADAPack 100 jumper J6 must be connected.
- Use the RJ-45 to RJ-45 cable (part number 297303).

SCADAPack 330/334

- When connecting to COM1 on the SCADAPack 330 jumper J8 must be in the **RS-232** position and jumper J7 must be in the **+5V** position. Use the RJ-45 to RJ-45 cable (part number 297303).
- When connecting to COM2 on the SCADAPack 330 jumper J10 must be in the **RS-232** position and jumper J7 must be in the **+5V** position.. Use the RJ-45 to RJ-45 cable (part number 297303).
- When connecting to COM3 on the SCADAPack 330 jumpers J11 and J12 must be in the **Normal** position. Use the RJ-45 to RJ-45 cable (part number 297303).
- Use the RJ-45 to RJ-45 cable (part number 297303).

SCADAPack 350

- When connecting to COM2 on the SCADAPack 350 jumper J13 must be in the **RS-232** position. Use the RJ-45 to RJ-45 cable (part number 297303).

- When connecting to COM3 on the SCADAPack 350 jumpers J15 and J16 must be in the **Normal** position. Use the RJ-45 to RJ-45 cable (part number 297303).
- Use the RJ-45 to RJ-45 cable (part number 297303).

SCADAPack 32

- When connecting to COM1 on the SCADAPack 32 jumper J4 (Com Port 5V) must be connected. And jumper J10 must be in the **RS-232** position.
- When connecting to COM2 on the SCADAPack 32 jumper J4 (Com Port 5V) must be connected.
- When connecting to COM4 on the SCADAPack 32 jumper J4 (Com Port 5V) must be connected.

5601 and 5602 I/O Modules

- The 5913 may be connected to COM3.
- Use the RJ-45 to DE9S cable (part number 297304).

5604 I/O Module

- The 5913 may be connected to COM3.
- Use the RJ-45 to RJ-45 cable (part number 297303).

4.2 5913 Serial Port Connections

The following diagram shows the pin connections for the RS-232 (RJ-45 Modular Jack) port connector for the 5913.

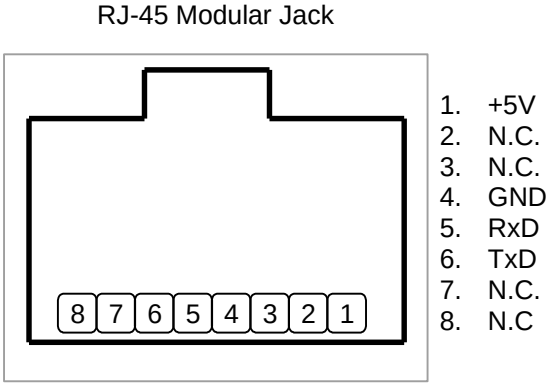


Figure 1: RJ-45 Connector Pinout

Pin	Function	Description
1	5V	Input +5V supplied by the SCADAPack controller.
4	GND	System ground.
5	RxD	Input 0 to 5V signal levels
6	TxD	Output

Pin	Function	Description
		0 to 5V signal levels

4.3 Serial Port Communication Parameters

The serial port on the 5913 module is set for **9600** baud, **8** data bits, **no** parity and **1** stop bit at the factory. These setting may be viewed or changed using the AT commands described in the 5913 AT Command Appendix.

4.4 5913 Dimensions and LEDs

The dimensions of the 5913 are shown in ***Figure 2: 5913*** below.

- The Blue LED indicates that a *Bluetooth* connection is made with another *Bluetooth* device.
- The Green LED indicates that the 5913 is powered by a 5VDC source.

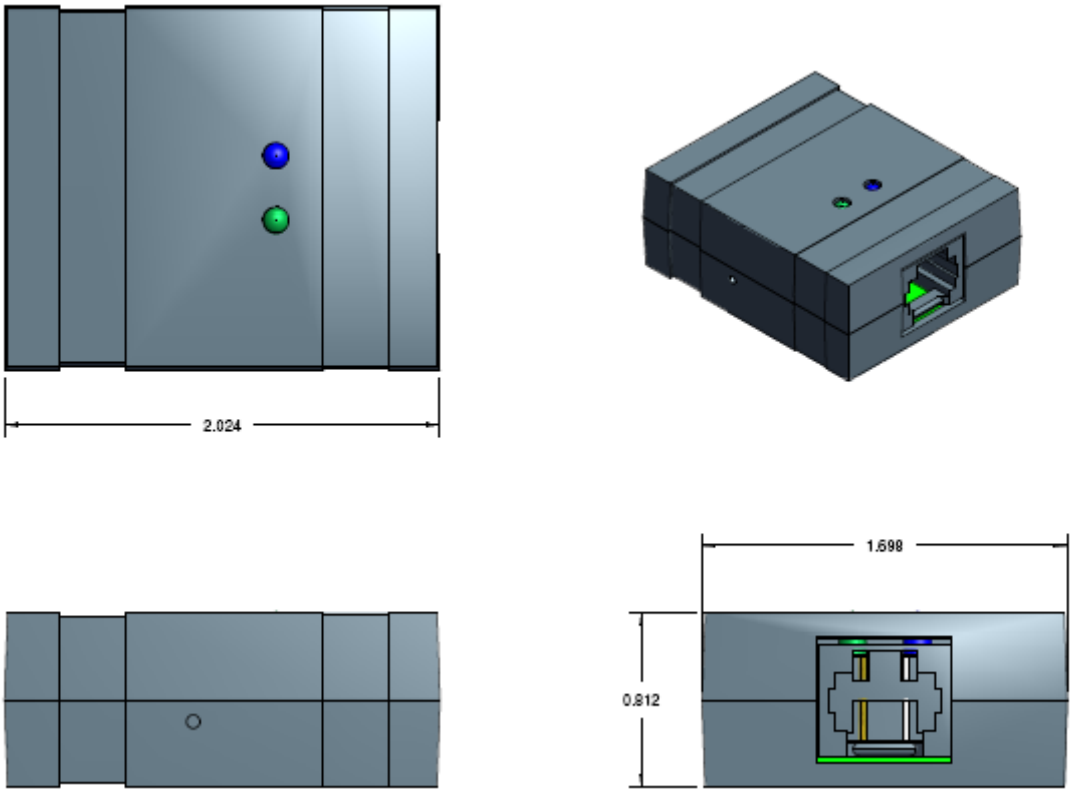


Figure 2: 5913 Dimensions

4.5 5914 Connection

The 5914 connects directly to a USB port on a laptop or PC. The 5914 cannot be connected to the USB ports on SCADAPack 300 Series controllers.

5 Maintenance

This module requires no routine maintenance. If the module is not functioning correctly, contact Control Microsystems Technical Support for more information and instructions for returning the module for repair.

6 Specifications

***Disclaimer**: Control Microsystems reserves the right to change product specifications without notice. For more information visit www.controlmicrosystems.com .*

6.1 5913

6.1.1 General

Terminations	8 pin modular jack
Dimensions	2.02 inch (51 mm) 1.70 inch (43 mm) 0.81 inch (21 mm)
Mounting	Velcro mounting supplied.
Environment	–40°C to 70°C (–40°F to 158°F) operation and storage

6.1.2 Communications

General	Radio modem compatible with Bluetooth® enabled devices. Frequency Hopping Spread Spectrum. Encryption, PIN identification and Error Correction.
Frequency	2.402 to 2.48 GHz. (ISM 2.4GHz band.)
Channels	79 at 1MHz. intervals
Distance	Class 1: 100m (330 ft.) **NOTE:** When the 5913 is used with a *Bluetooth* device that is Class 2 the maximum distance achieved will be approximately 3m or 10 ft. (Class 2)
Receive Sensitivity	–83dBm typical
Transmit Power	12dBm max. (software adjustable)
Antenna	Integrated chip antenna
Host side	TxD and RxD implemented

6.1.3 Power Supplies and Power Consumption

Voltage Requirements	5V supplied by the controller Pin 9 on the 5913-D. Pin 1 on 5913-J.
Current Requirements	80mA transmit 40mA receive 1.4mA idle mode 30uA deep sleep 120mA worst case peak

6.1.4 Approvals and Certifications

Safety	Electrical Equipment for Use in Class I, Division 2 Groups A, B, C and D Hazardous Locations. C(CSA)us Temperature Code T5.
Digital Emissions	FCC 47 CFR Part 15, Subpart B, Class A Verification EN61000-6-4: 2001 Electromagnetic Compatibility

	Generic Emission Standard Part 6-4: Industrial Environment.
Immunity	EN61000-6-2: 2001 Electromagnetic Compatibility Generic Standards Part 6-2: Immunity for Industrial Environments
Declaration	This product conforms to the above Emissions and Immunity Standards and therefore conforms with the requirements of Council Directive 89/336/EEC (as amended) relating to electromagnetic compatibility and is eligible to bear the CE mark. The Low Voltage Directive is not applicable to this product.

6.2 5914

6.2.1 General

Terminations and Mounting	USB Connection
Dimensions	1.8 inch (47 mm) 0.67 inch (17 mm) 0.33 inch (8.5 mm)
Environment	0^{o}C to 50^{o}C (32^{o}F to 122^{o}F) operation -20^{o}C to 70^{o}C (-4^{o}F to 158^{o}F) storage

6.2.2 Communications

General	Radio modem compatible with Bluetooth® enabled devices. Frequency Hopping Spread Spectrum. Encryption, PIN identification and Error Correction.
Frequency	2.402 to 2.48 GHz. (ISM 2.4GHz band.)
Channels	79 at 1MHz. intervals
Distance	Class 1: 100m (330 ft.)
Receive Sensitivity	< 0.1%BER at –70dBm typical
Transmit Power	Class 1
Antenna	Printed antenna