5908 Radio Transceiver Module

Installation, Operation and Maintenance Setup Manual

5/19/2011

Schneider Electric

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed. Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

	The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result** in death or serious injury.

⚠CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result** in minor or moderate.

CAUTION

CAUTION used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result** in equipment damage..

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved.

BEFORE YOU BEGIN

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

⚠ CAUTION

EQUIPMENT OPERATION HAZARD

Verify that all installation and set up procedures have been completed.

Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.

Remove tools, meters, and debris from equipment.

Failure to follow these instructions can result in injury or equipment damage.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and grounds, except those grounds installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove ground from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

OPERATION AND ADJUSTMENTS

The following precautions are from the NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

About The Book

At a Glance

Document Scope

This manual describes the operation and maintenance of the 5908 Transceiver (FreeWave) module.

Validity Notes

This document is valid for all versions of the 5908 Transceiver (FreeWave) module.

Product Related Information

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter and apply this product.

Follow all local and national safety codes and standards.

Failure to follow these instructions can result in death, serious injury or equipment damage.

User Comments

We welcome your comments about this document. You can reach us by e-mail at technicalsupport@controlmicrosystems.com.

Overview

The 5908 Radio Transceivers are based on FreeWave 900MHz and 2.4GHz Spread Spectrum technology respectively. The FreeWave 2.4GHz version is not available in North America. These Wireless Data Transceivers are available as standalone units or can be integrated with any type of SCADAPack controller thus providing a single wireless controller package.

The Radio Module has a terminal connection for DC power input and two RJ-45 connections for transceiver configuration and serial communication. The Transceiver is completely configurable using a terminal program such as Hyper Terminal.

If purchased as a wireless controller package, the FreeWave Wireless Data Transceiver is mounted in an embedded Radio Module. The Radio Module is located under the cover of the Wireless SCADAPack controller. The Wireless SCADAPack controllers come complete with an integrated power supply, analog and digital I/O, counter inputs and serial communication ports depending on the SCADAPack selected. Application programs can be written in Relay Ladder Logic, IEC 61131-3 and the C language.

The Wireless SCADAPacks include:

- Wireless SCADAPack 100
- Wireless SCADAPack LP
- Wireless SCADAPack
- Wireless SCADAPack 32
- Wireless SCADAPack 32P
- Wireless SCADAPack LP
- TeleSAFE Micro16

This user manual is not a complete reference for the SCADAPack controller or the FreeWave Wireless Data Transceiver. The user manuals, in pdf format, for each product are included on the “Hardware Documentation Configuration Applications” CD that is included with shipments from our factory. Refer to the ***FreeWave Spread Spectrum Wireless Data Transceiver User Manual*** for detailed information on the FreeWave Data Transceiver.

Getting Started

The SCADAPack Wireless controllers are shipped from the factory with default configurations for the SCADAPack controller board and the Radio Module. These setting may need to be modified for optimum operation for individual systems.

- Power the Wireless SCADAPack controller as explained in section ***Power Supply Connection***.
- Make serial port connections as explained in section ***Serial Communication Ports***.
- Make antenna connection to the Radio Module as explained in section ***Antenna Connections***.
- Configure the Radio Module as explained in section ***Radio Module Configuration***.
- Configure and program the SCADAPack controller as required by your system configuration. Refer to the appropriate SCADAPack controller hardware manual and the Telepace or IEC 61131-1 programming reference.

Installation

The installation of Wireless SCADAPack controllers requires mounting the Wireless SCADAPack controller on the 7.5mm by 35mm DIN rail.

Complete information on field wiring and configuration of the 5908 transceiver is covered in this manual. Any additional information regarding the operability of the radio can be found in the ***FreeWave Spread Spectrum Wireless Data Transceiver User Manual.***

Information on the field wiring and installation of the SCADAPack controller integrated with the FreeWave radio can be found in the respective Installation and User manual.

Power Supply Connection

The Radio Module is powered from a 12VDC to 24VDC input power source. This source is typically the same source the SCADAPack 100 and LP controllers are powered from.

- 12VDC to 24VDC input power is applied to the positive (+) and negative (-) terminals on **PWR IN** connector P1.

The connector is removable allowing replacement of the Radio Module without disturbing the field wiring. Leave enough slack in the field wiring for the connector to be removed.

To remove the termination connector:

- Pull the connector upward from the board. Apply even pressure to both ends of the connector.

To install the termination connector:

- Line up the pins on the module with the holes in the connector.
- Push the connector onto the pins. Apply even pressure to both ends on the connector

System Grounding

It is desirable to ground the system by connecting the system power supply common, to the chassis or panel ground. The negative (–) side of the PWR IN terminal is connected to chassis ground.

Default Setup Connection

The **SETUP** terminals provide a simple method to re-establish communication with the Radio Module in the event of an incorrect configuration. While uncommon it is possible to accidentally configure the COM (Main) port as the only programming port, resulting in the inability to connect to the Radio Module using HyperTerminal.

The following procedure will place the COM (Main) port into Setup mode, allowing a HyperTerminal connection on the COM port. Once this is done the Radio Module can be re-configured to use the DIAG port as the configuration port.

- Set up a HyperTerminal session as described in section ***Configure a HyperTerminal Session***.
- Connect the PC running HyperTerminal to the COM port on the Radio Module.
- Connect a jumper wire to short the SETUP terminals together.

- Type a “U” (capital U) in the HyperTerminal window. The Radio Module configuration Main Menu will be displayed.
- Remove the jumper from the SETUP pins
- In the HyperTerminal window enter the number 1 to go to the Set Baud Rate page.
- Enter the letter D to go to the Setup Port page. This setting determines which port, COM or DIAG, is used to enter the Set Up Main Menu.
- Enter the number **3** to allow radio setup through both the **COM** and **DIAG** ports. The DIAG port is now reset to the configuration port.

Entering 1 will configure the COM port as the setup port. Entering 2 will configure the DIAG port as the setup port.

Serial Port Connections

The two RS-232 communication ports, **COM** and **DIAG**, connect to 8 pin modular RJ-45 jacks. Refer to section ***Serial Communication Ports*** for pinout details and wiring diagrams for these modular jacks.

The **COM** serial port is used to connect the Radio Module to a serial port on the model 5208 SCADAPack 100 controller board or the model 5207 SCADAPack LP controller board. This port is configured at the factory for 9600 baud, 8 data bits, no parity and 1 stop bit. This port is fully configurable using the Setup Program. See section ***Set Baud Rate*** for information on configuring the COM port.

The **DIAG** serial port is used for configuration of the Radio Module. This port is fixed at 19,200 baud, 8 data bits, no parity and 1 stop bit. See section ***Radio Module Setup Program*** for information on configuration of the Radio Module.

Antenna Connections

The antenna connection for the SCADAPack Wireless controller is a female type SMA jack (900MHz. version) connector on the left side of the controller chassis. The 2.4GHz. version uses a RP-SMA jack.

Refer to the ***FreeWave 900MHz Spread Spectrum Installation Manual*** for antenna installation information.

Antennas and feed lines need to be professionally installed as directed in **the *FreeWave 900MHz Spread Spectrum Installation Manual.***

Control Microsystems has antenna, feed line and surge protector package available. Please contact Control Microsystems Sales for information on this package.

For desktop configuration of Radio Module parameters the radio may be operated without an antenna connection for limited periods.

LED Indicators

There are 3 LEDs on the Radio Module. These LEDs are two color LEDs. The tables below describe the LED state for the various operation conditions of the multipoint master and slave Radio Module.

Multipoint Master Radio Module LEDs

Condition	Master CD	Master TX	Master CTS
Radio in setup mode	Solid Green	OFF	Solid Green
Multipoint master, radio link established, after exiting setup	Solid Red	Dim Red	OFF
Multipoint master, radio link established, after power up	Solid Red	Dim Red	OFF
Multipoint master, no radio link	Solid Red	Dim Red	OFF

Multipoint Slave Radio Module LEDs

Condition	Slave CD	Slave TX	Slave CTS
Radio in setup mode	Solid Green	OFF	Solid Green
Multipoint slave, radio link established, after exiting setup	Solid Green	OFF	Solid Red
Multipoint slave, radio link established, after power up	Solid Green	OFF	Solid Red
Multipoint slave, no radio link	Solid Red	OFF	Flashing Red

Radio Module Configuration

The typical installation for a 5908 transceiver is in a point to multipoint configuration. In this configuration a single master transceiver communicates with a number of slave transceivers. The user is encouraged to thoroughly read the ***Multipoint Operation*** section of the *FreeWave Spread Spectrum Wireless Data Transceiver User Manual* for complete information on using Multipoint systems.

It is recommended that the following steps be used to configure the Radio Modules in your network.

- Open the Radio Module Setup program.
- Set the Operation Mode for the master and slave Radio Modules.
- Set the Baud Rate for the COM port.
- Set the Radio Transmission Characteristics.
- Set the Multipoint Parameters.

Radio Module Setup Program

The Radio Module radios are shipped from the factory with default configuration settings. These setting will typically need to be adjusted for an individual network. Radio Module configuration is done using a terminal emulation program, such as Windows HyperTerminal, and the DIAG serial port on the Radio Module.

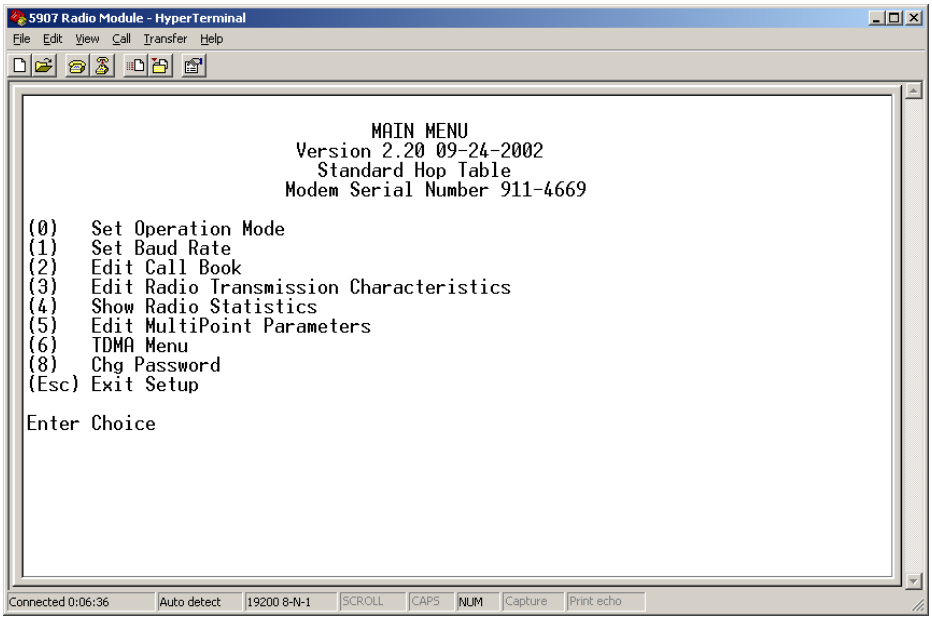
The DIAG serial port on the Radio Module is set for 19200 baud, 8 data bits, no parity and 1 stop bit. The HyperTerminal communication properties are set to match these settings.

Configure a HyperTerminal Session

- Open HyperTerminal and create a new connection.
- Once the new connection is created and named the Connect To dialog is opened. Select a serial port that is available on your PC. COM1 or COM2 etc.
- In the Properties dialog set the following parameters:

  Bits Per Second = 19, 200
  Data Bits = 8
  Parity = None
  Stop Bits = 1
  Flow Control = XON/XOFF

- To enter the Radio Module Setup program, simply type a “U” (capital U) in the HyperTerminal window. The Radio Module configuration Main Menu will be displayed as shown below:



The basic configuration changes required are discussed in the following paragraphs. The user is encouraged to read the detailed description for each parameter in the ***FreeWave Spread Spectrum Wireless Data Transceiver User Manual***.

Set Operation Mode

5908 transceivers are shipped with the Radio Modules configured for Point to Multipoint Slave operation. In a typical network there will be one master Wireless SCADAPack controller and multiple slave Wireless SCADAPack controllers. The Operation Mode for the master Wireless SCADAPack controller are set to Point to Multipoint Master operation.

To configure a Radio Module for Point to Multipoint Master operation:

- From the Radio Module Setup program Main Menu enter "**0**" in the Enter Choice selection to open the Set Modem Mode menu.
- Enter "**2**" in the Enter Choice selection to select Point to Multipoint Master operation mode.
- Press the "**Esc**" key to return to the Main Menu.

For further information on the Operation Modes refer to the **Operation Modes Selections** section of the FreeWave Spread Spectrum Wireless Data Transceiver User Manual.

Set Baud Rate

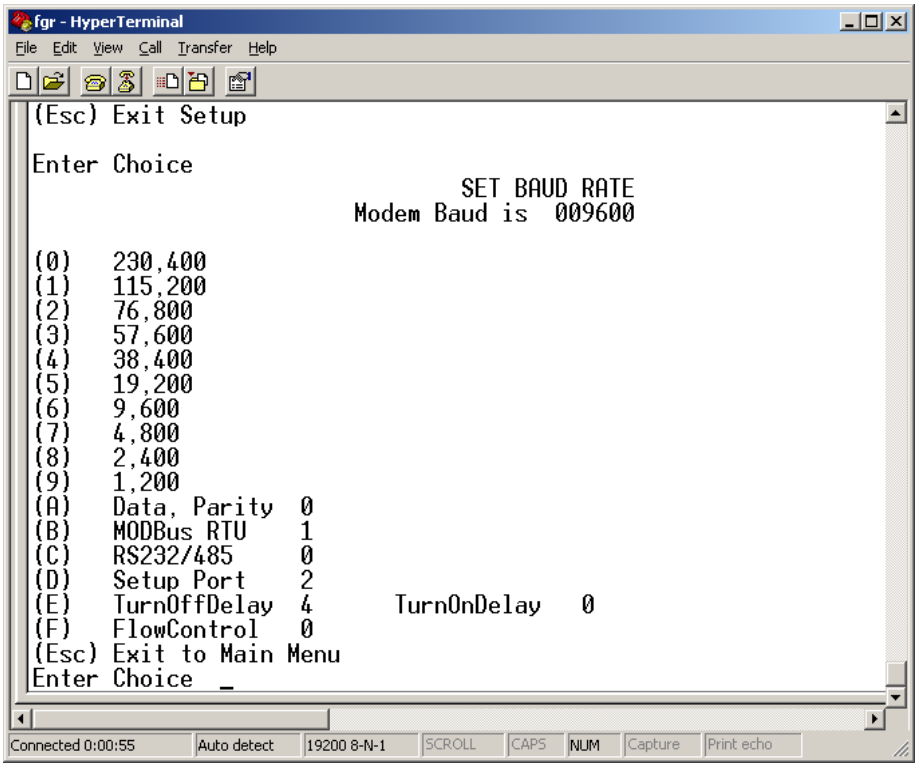
The Set Baud Rate selection is used to set the baud rate, and communication parameters for the COM port on the Radio Module. The COM port settings on the

Radio Module and the serial port settings for the SCADAPack controller serial port it is connected to need to be set to the same values.

The COM port is set to 9600 baud, 8 data bits, no parity and 1 stop bit at the factory. Depending on your system configuration you may wish to change the COM port settings.

To configure the Radio Module COM port parameters:

- From the Radio Module Setup program Main Menu enter "**1**" in the Enter Choice selection to open the Set Baud Rate menu.
- Enter the number for the required baud rate in the Enter Choice selection.



- Press the "**Esc**" key to return to the Main Menu.

For further information on other COM port settings, such as data word length and parity refer to the ***Baud Rate Selection***s section of the *FreeWave Spread Spectrum Wireless Data Transceiver User Manual*.

Edit Radio Transmission Characteristics

The Radio Transmission Characteristics are set to identical values for Radio Modules at the factory. If any changes are made to these settings they need to be identical for every Radio Modules in the network.

Changes should **only** be made after consulting the ***Radio Transmission Parameters*** section of the FreeWave Spread Spectrum Wireless Data Transceiver User Manual.

To configure the Radio Module Radio Transmission Characteristics:

- From the Radio Module Setup program Main Menu enter "**3**" in the Enter Choice selection to open the Radio Parameters menu.
- Enter the number for the parameter to modify in the Enter Choice selection.
- Press the "**Esc**" key to return to the Main Menu.

Edit Multipoint Parameters

The Edit Multipoint Parameters are set to identical values for Radio Modules at the factory. With the exception of the Network ID these values will not usually require changes. The Network ID, for Radio Modules, needs to be changed from the factory default to so the Radio Modules will communicate with the network master station.

If you are installing the network in an environment where other networks are operating in close proximity you may need to change some Multipoint and Radio Transmission Characteristics parameters. Refer to the ***Multipoint Operation*** section of the *FreeWave Spread Spectrum Wireless Data Transceiver User Manual*.

To configure the Radio Module Network ID:

- From the Radio Module Setup program Main Menu enter "**5**" in the Enter Choice selection to open the Multipoint Parameters menu.
- Enter "**6**" in the Enter Choice selection to select Network ID.
- Enter the Network ID for you network. This number may not be 255 and is between 0 and 4095. Note that every Radio Module in the network must have the same Network ID.
- Press the "**Esc**" key to return to the Main Menu.

Serial Communication Ports

The Radio Module is equipped with two RS-232 serial communication ports labeled **COM** and **DIAG**. These serial communication ports use RJ-45 type connectors. The **COM** port can be configured for RS-232 or RS-485 operation.

The **COM** serial port is the communication interface to the Radio Module. The **DIAG** port is used to configure the Radio Module communication and network parameters.

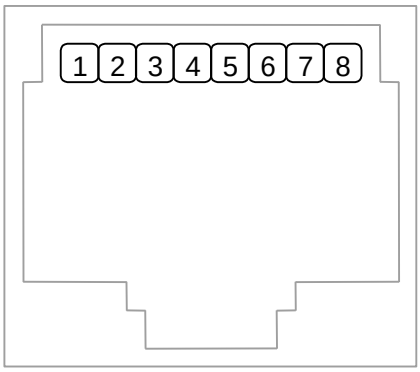
DIAG - Diagnostics Port

The following table shows the serial communication parameters used by the DIAG port. These parameters are fixed at the factory and cannot be modified.

Parameter	Supported Values
Baud Rate	Fixed at 19200
Duplex	Fixed at Full
Parity	Fixed at None
Data Bits	Fixed 8 Bits
Stop Bits	Fixed at 1 Bit

Connections to the DIAG port are made through a RJ-45 modular connector. The DIAG port supports Tx, Rx and ground signals. The following diagram shows the pin connections for the RS-232 (RJ-45) port connector for the DIAG port.

RJ-45 Modular Jack



1. NC
2. NC
3. NC
4. GND
5. RxD
6. TxD
7. NC
8. NC

The following table provides a description of the function of each pin of the RJ-45 connector. In this table a MARK level is a voltage of +3V or greater and a SPACE level is a voltage of 0V.

Pin	Function	Description
1	NC	No connection.
2	NC	No connection.
3	NC	No connection.
4	GND	This pin is connected to the system ground.
5	RxD (Input)	The level is SPACE on standby and MARK for received data.
6	TxD (Output)	The level is SPACE on standby and MARK for transmitted data.
7	NC	No connection.
8	NC	No connection.

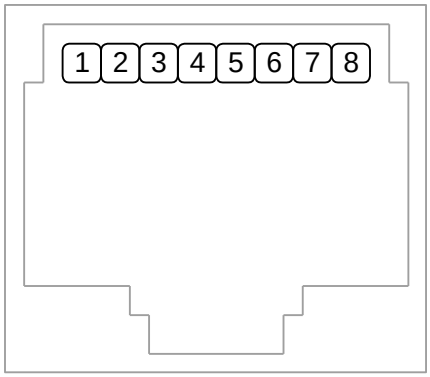
COM – RS-232/485 Communications Port

Serial port COM on the Radio Module is configured as an RS-232 or RS-485 serial communication port. The following table shows the serial communication parameters supported by COM. These parameters are set using Radio Module Setup Program. Default values are set at the factory.

Parameter	Supported Values
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400. Default: 9600
Parity	Odd, None or Even Default: None
Data Bits	7 or 8 Bits Default: 8 Bits
Stop Bits	1 or 2 Bits Default: 1 Bit

Connections to COM are made through a RJ-45 modular connector. COM supports RxD and TxD plus Ground. The following diagram shows the pin connections for the RJ-45 port connector for COM.

RJ-45 Modular Jack



1. N/C
2. DCD
3. DTR
4. GND
5. RxD (RS-232) / Rx+ (RS-485)
6. TxD (RS-232) / Tx+ (RS-485)
7. CTS (RS-232) / Rx– (RS-485)
8. RTS (RS-232) / Tx– (RS-485)

The following table provides a description of the function of each pin of the RJ-45 connector. In this table a MARK level is a voltage of +3V or greater and a SPACE level is a voltage of 0V.

Pin	Function	Description
1	NC	No connection.
2	DCD	The DCD led is on for a MARK level.
3	DTR	This pin is normally at a MARK level. This pin is at a SPACE level when DTR is de-asserted.
4	GND	This pin is connected to the system ground.
5	RxD / Rx+ (Input)	The level is SPACE on standby and MARK for received data. (Also used as Rx+ in RS-485 operation.)
6	TxD / Tx+ (Output)	The level is SPACE on standby and MARK for transmitted data. (Also used as Tx+ in RS-485 operation.)
7	CTS / Rx- (Input)	A MARK level is required for the communication port to transmit data. When the attached device does not provide this signal, the controller keeps the line at a MARK. When the attached device does provide this signal, it sets CTS to MARK to allow the controller to transmit data. (Also used as Rx– in RS-485 operation.)
8	RTS / Tx- (Output)	This pin is a MARK if full-duplex operation is selected for the port. This pin is set to a MARK just before and during transmission of data if half-duplex operation is selected. This pin is set to a SPACE when no data is being transmitted. (Also used as Tx– in RS-485 operation.)

RS-232 Cables

RJ-45 to DE-9S DTE

This cable is used to connect from the RJ-45 based RS-232 COM or DIAG port to a SCADAPack controller DE-9P connector. A 6 in. long cable is available from Control Microsystems as part number TBUM307242.

RJ-45 8 Pins	RJ-45 DTE Function	DE9S DTE Function	DE9S 9 Pins
			Shield optional, connects to shell if used.
6	TxD	RxD	2
5	RxD	TxD	3
4	GND	GND	5
7	CTS	RTS	7
8	RTS	CTS	8
1	5V	5V	9
2 and 3 No wires connected at this end.			Wires not connected at this end; 1, 4 and 6.

RJ-45 to RJ-45 DTE

This cable is used to connect from the RJ-45 based RS-232 COM or DIAG port to a SCADAPack RJ-45 based serial port. A 7 in. long cable is available from Control Microsystems as part number TBUM307224.

RJ-45 8 Pins	RJ-45 DTE Function	RJ-45 DTE Function	RJ-45 8 Pins
			Shield optional, connects to shell if used.
6	TxD	RxD	5
5	RxD	TxD	6
4	GND	GND	4
7	CTS	RTS	8
8	RTS	CTS	7
1	5V	5V	1
2 and 3 No wires connected at this end.			Wires not connected at this end; 2 and 3.

RS-485 Wiring

The communication can be set up for RS-485 4-wire full duplex or 2-wire half duplex.

RS-485 4-wire Full Duplex

COM pin	RS-485 function
5	Rx+
6	Tx+
7	Rx–
8	Tx–

RS-485 2-wire Half Duplex

COM pin	RS-485 function
5 connected to 6	+ or A
7 connected to 8	– or B

Maintenance

The Radio Module requires no maintenance. If the Radio Module is not functioning correctly, contact Control Microsystems Technical Support for information on returning the Wireless SCADAPack for repair.

Troubleshooting

Condition	Action
Cannot connect to DIAG configuration port.	Confirm that the correct serial cable is being used and is connected to the DIAG port and your PC. Confirm that HyperTerminal is set for the correct DIAG port serial communication settings.
SCADAPack controller will not communicate with Radio Module.	Check that the serial port settings for the SCADAPack controller serial port and the COM settings for the Radio Module are the same.
Leds on Radio Module are off.	Check that correct power is connected to the PWR IN terminals on the Radio Module.
Leds on Radio Module and SCADAPack controller are off.	Check that the SCADAPack controller is properly powered as described in the controller user manual. Check that correct power is connected to the PWR IN terminals on the Radio Module.

Specifications

Disclaimer: Control Microsystems reserves the right to change product specifications. For more information visit *www.controlmicrosystems.com* .

900 MHz Transceiver Specification

Frequency	902 to 928 MHz
Transmit	
Output Power	5 mW to 1 W (+30 dBm) See RF transmit power settings.
Range	60 miles Line Of Sight, 0 dB antenna gain
Modulation	Spread spectrum GSK, 120 or 170 Kbps
Spreading method	Frequency hopping
Occupied bandwidth	230 MHz
Receive	
Sensitivity	-110 dBm at 10-4 bit error rate -108 dBm at 10-6 bit error rate
Selectivity	20 dB at ± 115 kHz 60 dB at fc ± 145 kHz
System gain	140 dB
Data transmission	
Data rate	115.2 kbps sustained throughput* 57.6 kbps sustained throughput* with repeaters.
Error detection	32 Bit CRC, retransmit on error
Data encryption	Substitution, dynamic key
Max link throughput	Kbaud standard speed, 38.4 Kbaud low speed.
Data interface	RS-232/RS485 1200 Baud to 230.4 Baud, async, full duplex TTL (RF board level only) Ethernet 10BaseT
Power requirements	
Supply voltage	7 to 30 VDC UL508 rated 13.75-28VDC. Class 2.
Transmit current, for 1 W power at 100% duty cycle	12 VDC: 500 mA 30 VDC: 200 mA

Receive current	12 VDC: 86 mA 30 VDC: 43 mA
Idle current	12 VDC: 21 mA 30 VDC: 12 mA
Sleep current	12 VDC: 6 mA 30 VDC: 3 mA
Operating modes	Point-to-Point Point to-MultiPoint Store and forward Repeater
Operating environment	-40° C- +75° C, 0 to 95% humidity non-condensing

At 100% receive success rate. RF data rate setting of 2.

2.4 G Hz Transceiver Specifications

Frequency	2.400 to 2.4835 GHz
Transmitter	
Output power	0.5 mW to 500 mW (+27 dBm) See RF transmit power settings.
Range	20 miles Line Of Sight with 5dB omni antenna
Modulation	GFSK, 115.2 or 153.6 Kbps
Occupied bandwidth	230 kHz
Receiver	
Sensitivity	-107 dBm at 10-4 bit error rate -105 dBm at 10-6 bit error rate
Selectivity	20 dB at f_c ± 115 kHz 60 dB at f_c ± 145 kHz
System gain	134 dB
Data transmission	
Error detection	32 Bit CRC, retransmit on error
Data encryption	Substitution, dynamic key
Link throughput	115.2 kbps sustained throughput* 57.6 kbps sustained throughput* with repeaters.
Data interface	RS-232/RS485 1200 Baud to 230.4 Baud, async, full duplex TTL (RF board level only)
Power requirements	
Supply voltage	10 – 30 VDC

	UL508 rated 13.75-28VDC. Class 2.
Transmit current, for 500 mW power at 100% duty cycle	325 mA at 12 VDC 150 mA at 30 VDC
Receive current	115 mA at 12 VDC 60 mA at 30 VDC
Idle current	30 mA at 12 VDC 13 mA at 30 VDC
Sleep current	5 mA at 12 VDC 2 mA at 30 VDC
Operating modes	Point-to-Point Point to-MultiPoint Store and forward Repeater
Operating environment	-40° C- +75° C, 0 to 95% humidity non-condensing

At 100% receive success rate. RF data rate setting of 2.

Connectors

Power Input Connector PWR IN	4 pole, removable terminal block 12 to 22 AWG 15A contacts Screw termination - 6 lb.-in. (0.68 Nm) torque
Communication Port COM	RS-232 serial port Data Terminal Equipment (DTE) 8 pin modular jack Implemented TxD, RxD, CTS, RTS, DCD, DTR
Diagnostics Port DIAG	RS-232 serial port Data Terminal Equipment (DTE) 8 pin modular jack Implemented TxD, RxD
Internal Communication Port	RS-232 serial port flex cable connector, 1mm centerline (not installed) Implemented TxD, RxD, CTS, RTS, DCD, DTR, +5V
RF	900MHz. - SMA jack 2.4GHz. - RP-SMA jack

Wireless Controller

I/O Terminations	4 pole, removable terminal block 12 to 22 AWG 15A contacts 8 pole modular jacks
Packaging	Mounts inside the following SCADAPack controllers: SCADAPack SCADAPack LP SCADAPack 100 SCADAPack 32 SCADAPack 32P Micro16 Data Transceiver is the stand-alone version.
Dimensions	SCADAPack, SCADAPack 32 8.40 inch (213mm) wide 6.13 inch (155mm) high 3.50 inch (89mm) deep SCADAPack LP 8.40 inch (213mm) wide 5.00 inch (127mm) high 2.40 inch (61mm) deep SCADAPack 100. Data Transceiver 5.65 inch (144mm) wide 5.00 inch (127mm) high 2.40 inch (61mm) deep SCADAPack 32P, Micro16 8.40 inch (213mm) wide 4.63 inch (118mm) high 2.40 inch (61mm) deep
Environment	5% RH to 95% RH, non-condensing –40°C to 70°C –40°F to 158°F
Isolation	Common ground return connected to Chassis Ground

Visual Indicators

CD, TX, CTS	Three bicolor red/green LEDs.

Approvals and Certifications

Hazardous Locations - North America	cULus Class 1, Div. 2 Groups A, B, C and D Hazardous Locations. (900MHz Transceivers Only) UL Listed and CSA certified to the requirements of: • CSA Std. C22.2 No. 213-M1987 - Hazardous Locations. • UL Std. No. 1604 - Hazardous (Classified) Locations.
Safety	CSA (cCSAus) certified to the requirements of: CSA C22.2 No. 142-M1987 and UL508. (Process Control Equipment, Industrial Control Equipment) UL (cULus) listed: UL508 (Industrial Control Equipment)
Digital Emissions	FCC Part 15, Subpart B, Class A Verification EN50081-2: 1993 Electromagnetic Compatibility Generic Emission Standard Part2: Industrial Environment
Immunity	EN61000-6-2:1999 Electromagnetic Compatibility Generic Standards Immunity for Industrial Environments

CE Mark Self Declaration

Control Microsystems attests that the Wireless SCADAPack Controller, comply under Module “A”, self declaration route, with the European Harmonized Standards:

EN55081-2: 1993
Electromagnetic Compatibility
Generic Emission Standard
Part 2: Industrial Environment

EN 61000-6-2; 1999
Electromagnetic Compatibility
Generic Standards
Immunity For Industrial Environments

and are eligible to bear the CE mark:

The Machine Directive and Low Voltage Directives are not applicable to these products.