



IQ™ Spread Spectrum (SS) Radio

Installation & Programming Guide for the IQ™ Central Control System



Symbols



NOTE: Symbol alerts the user to important operating, functionality, maintenance or installation instructions.



WARNING: Symbol alerts the user to the presence of electricity within the device which may constitute a risk of electronic shock or other hazard.



CAUTION: Symbol alerts the user to important instructions or conditions that could seriously affect irrigation effectivity or device operation.

Safety Information

Regulatory Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by Rain Bird Corporation could void the user's authority to operate the equipment.

This product was FCC certified under test conditions that included the use of shielded I/O cables and connectors between system components. To be in compliance with FCC regulations, the user must use shielded cables and connectors and install them per instructions.

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Introduction

Welcome to Rain Bird

Thank you for purchasing your new state-of-the-art Rain Bird IQ Spread Spectrum Radio (SS-Radio) for the IQ Central Control System. For more than seven decades, Rain Bird has led the irrigation industry in meeting all of your water management needs by providing the highest quality products and services available.

The instructions in this manual guide you through installing and configuring the IQ SS-Radio for wireless communications between the IQ Central Computer and IQ Satellite Controllers.

IQ™ Central Control System

The IQ Central Control System provides remote communication capability for programming and monitoring multiple ESP-LXME and ESP-LXD Satellite Controllers from a single personal computer.

ESP-LX Series Controllers

Rain Bird ESP-LXME and ESP-LXD controllers normally operate as stand-alone irrigation controllers, but can be upgraded to become field components of the IQ Central Control System with the installation of an IQ Network Communications Cartridge.

IQ™ Network Communication Cartridge

The addition of an IQ Network Communication Cartridge (IQ-NCC) turns a new or existing ESP-LXME or ESP-LXD into an IQ Satellite Controller.

IQ™ Satellite Controllers

IQ Satellite Controllers are configured as either a Direct, Server, or Client Satellite. The differences and capabilities of each are listed below:

Direct Satellite

Direct Satellites communicate with the IQ Central Computer through a wired or wireless (IQ SS-Radio) connection to an IQ-NCC. Direct Satellites do not communicate with other Satellites.

Server Satellite

Server Satellites communicate with the IQ Central Computer through a wired or wireless (IQ SS-Radio) connection with an IQ-NCC. Communication with up to 255 other Client Satellites over the IQNet is accomplished using a radio modem (IQ SS-Radio) or a high-speed communication cable (PE) connection.

Client Satellite

Client Satellites communicate with the Server or other Client Satellites over the IQNet using a radio modem (IQ-SS Radio) or a high-speed communication cable (PE) connection.

IQ™ Spread Spectrum Radio

IQ SS-Radios connect to the IQ-NCC that is installed in a Satellite Controller to provide wireless radio communication between:

- The IQ Central Computer and an IQ Direct or Server Satellite Controller
- The IQ Server & Client Satellite Controllers (IQNet)
- Client Satellite Controllers (IQNet)

Products Covered in this Manual

This manual describes the following Rain Bird IQ™ products:

- IQ-Spread Spectrum (SS) Radio
- IQSSRPKIT IQ SS-Radio Programming Kit

IQ™ Spread Spectrum Radios

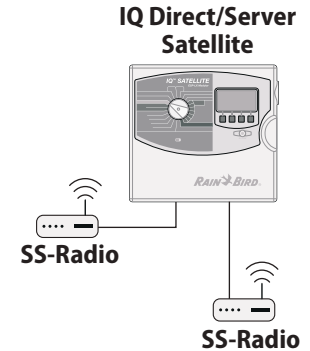
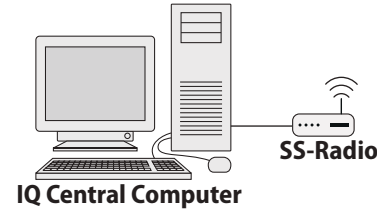
Capabilities

The IQ SS-Radio is a spread spectrum radio designed for reliable long-distance wireless communication, utilizing FHSS (Frequency Hopping Spread Spectrum) technology.

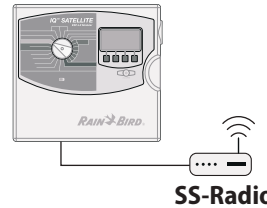
IQ SS-Radios can be connected to the IQ Central Computer and to any type of IQ Satellite Controller to provide wireless communications between components when wired connections are not possible or practical.



IQ SS-Radio



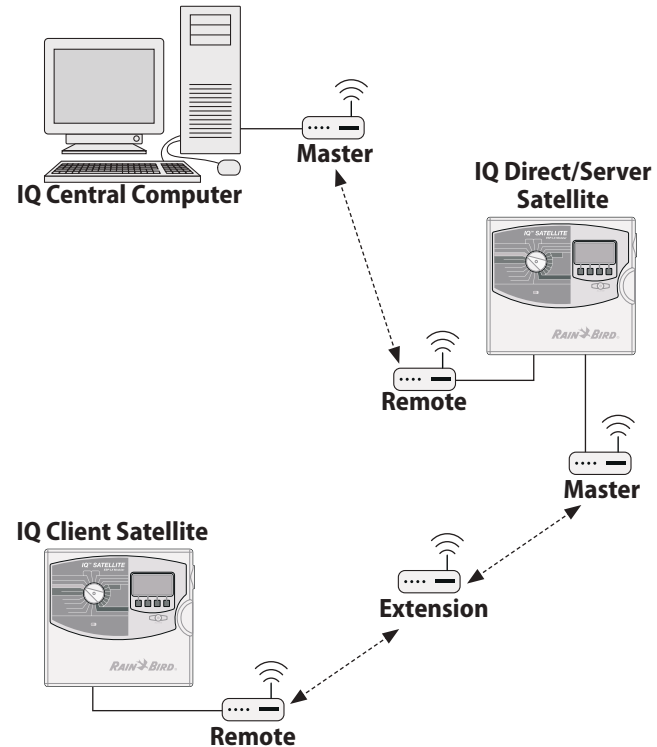
IQ Client Satellite



Configurations

There are three possible radio configurations for an IQ SS-Radio - Master, Remote, and Extension. Radios are configured after installation using the IQSSRPKIT IQ SS-Radio Programming Kit.

- Master - Used at the IQ Central Computer to communicate with a Direct or Server Satellite, or used at the Server Satellite to communicate with Client Satellites.
- Remote - Used at the Direct or Server Satellite to communicate with the IQ Central Computer, or used by Client Satellites to communicate with the Server and other Client Satellites.
- Extension - Used between any two radios as a repeater when a signal boost is required.

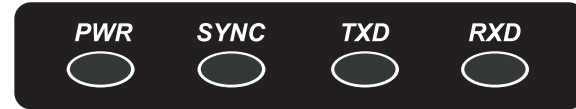


Controls and Indicators

LED Indicators

The radio LED lights on the front panel provide the following indications:

LED	Indication
PWR	Radio is powered on
SYNC	Radio is syncing with other radios
TXD	Data is being transmitted to another radio
RXD	Data is being received from another radio

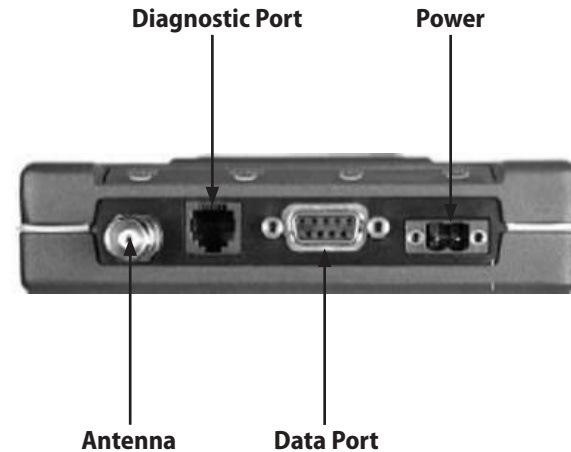


Radio LED Indicators

Connections

The four connections on the front of the SS-Radio are listed below:

Connection	Purpose
Antenna	Connect TNC Antenna or cable to an optional antenna
Programming Diagnostic Port	Connect radio to laptop computer for configuration
Data Port	Connect radio to the IQ computer or to a Satellite
Power Supply	Connect 6-30 VDC power supply cable



Installation

Overview

A Site Survey conducted by the Authorized Service Provider (ASP) is required to determine actual site conditions, satellite controller locations, radio ranges, antenna requirements, and any Extension radio locations.

Satellite controllers are typically installed in the field using one of the following methods:

- Wall Mount
- Pedestal Mount
- Strong Box

Radios can be mounted or installed on a wall next to a controller, or to the exterior of a pedestal or strong box. Contact the ASP or the local Rain Bird Salesperson if further assistance or guidance is required.

Items Required for Installation

- IQ SS-Radio Programming Kit (IQSSRPKIT), includes radio programming software and radio programming cable
- Serial cable for Master radio connection to IQ computer (Not provided, must be purchased separately)
- USB-to-Serial Adapter (required only if your computer does not have a Serial Port)

Radio Installation

IQ Central Computer

The Master radio should be mounted or placed (install brackets may be used) in a location close to the IQ computer.

To install the Master radio:

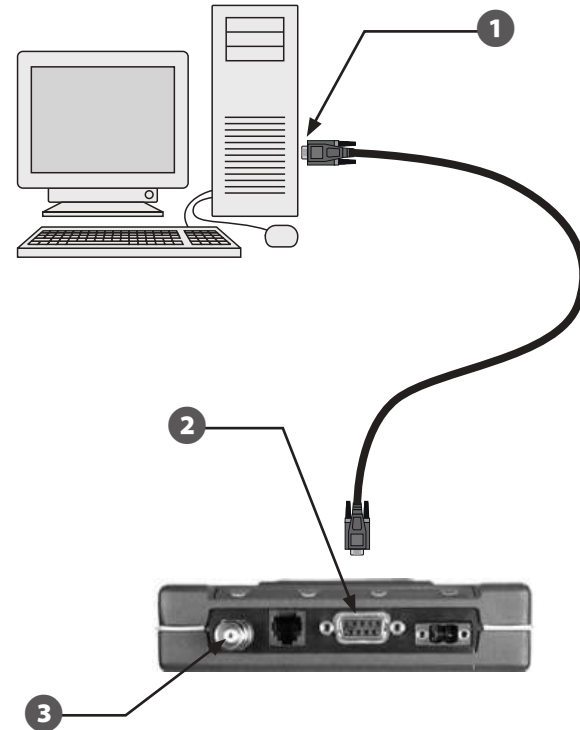
- 1 Connect one DB9 end of the serial cable to a serial port on the IQ computer.

! **NOTE:** If there is no serial port on the computer, use a USB to serial adapter to connect the cable to a USB port.

- 2 Connect the other end of the serial cable to the DB9 data port on the radio.

- 3 Connect the antenna (or antenna cable) to the TNC antenna jack.

! **NOTE:** Some applications may require stronger or taller antennas than the one provided with the SS-Radio in order to improve communication between radios. Refer to the Optional Antennas section in the Appendix for details.



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- 4 Connect the power supply cable to the power supply jack on the radio by tightening the two retainer screws with a small flathead screwdriver.

! **NOTE:** The radio requires a 120 VAC power source. The 120 VAC to 6-30 VDC power supply that ships with the radio must be used. Do not attempt to power the radio off of a satellite.


- 5 Plug the power supply into a 120 VAC power outlet.
- 6 Verify the radio is powered on.




**Retainer
Screws**

Satellite Controllers

A Satellite Controller may have one or two radios installed, a Remote and/or a Master, depending on the system configuration. The communication cables that will be necessary to install each type of radio should already be available.

 **NOTE:** Every IQ Satellite Controller requires the installation of an IQ Network Communication Cartridge (NCC) and the associated cables. If any communication cables are missing, not connected, or not installed, refer to the IQ-NCC Installation and User Guide or contact your ASP for assistance.

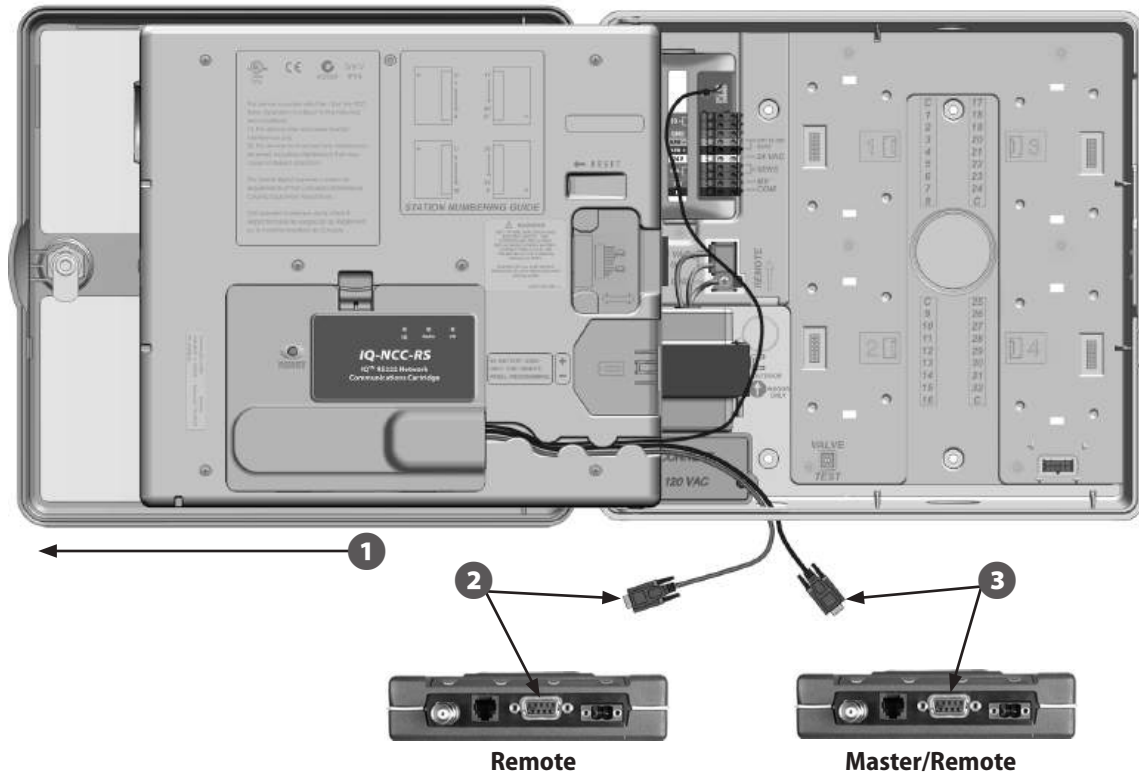
The radios should be mounted or placed securely (install brackets may be used) close to the IQ Satellite Controller. If the Controller has been installed outside, the radio must be protected from the weather.

 **NOTE:** There are several methods of installing controllers outdoors, including on an exterior wall, in a pedestal, or inside a strongbox. For assistance or guidance in the proper mounting of an SS-Radio, contact the ASP.

To install a Master or Remote radio:

- 1 Open the front panel of the Satellite Controller.
- 2 For a Remote radio (Direct or Server radio connection to the IQ computer), connect the serial communication cable from the IQ port of the IQ-NCC-RS cartridge to the DB9 data port on the radio.
- 3 For an IQNet Master radio (Server to Client) or IQNet Remote radio (Client to Client), connect the DB9 end of the Y-cable from the COM port of the cartridge to the DB9 data port on the radio.

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- 4 Connect the antenna (or antenna cable) to the TNC antenna jack.

! **NOTE:** Some applications may require stronger or taller antennas than the one provided with the SS-Radio in order to improve communication between radios. Refer to the Optional Antennas section in the Appendix for details.



- 5 Connect the power supply cable to the power supply jack on the radio by tightening the two retainer screws with a small flathead screwdriver.

! **NOTE:** The radio requires a 120 VAC power source. The 120 VAC to 6-30 VDC power supply that ships with the radio must be used. Do not attempt to power the radio off of a satellite.

- 6 Plug the power supply into a 120 VAC power outlet.
- 7 Verify the radio is powered on.



Retainer
Screws

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Extension Radios

If an IQNet Satellite Controller cannot establish radio communications with other satellites or the IQ computer, up to 5 radio repeaters (IQ SS-Radios configured as Extension) are allowed between controllers. The location of Extension radios are determined by the Site Survey.

! **NOTE:** For assistance or guidance in the proper mounting of an Extension radio, contact the ASP.

To install an Extension radio:

1 Connect the antenna (or antenna cable) to the TNC antenna jack.

! **NOTE:** Some applications may require stronger or taller antennas than the one provided with the SS-Radio in order to improve communication between radios. Refer to the Optional Antennas section in the Appendix for details.



2 Connect the power supply cable to the power supply jack on the radio by tightening the two retainer screws with a small flathead screwdriver.

! **NOTE:** The radio requires a 120 VAC power source. The 120 VAC to 6-30 VDC power supply that ships with the radio must be used. Do not attempt to power the radio off of a satellite.

3 Plug the power supply into a 120 VAC power outlet.

4 Verify the radio is powered on.



Configuration

Overview

Types of Networks

The primary network is considered to be the radio communication between the IQ computer and the Direct/Server Satellite. The secondary network is considered to be the radio communication between a Server and Client Satellite(s). One network cannot have more than one Master radio, so essentially two separate networks are required. Each network will have one Master radio with a unique Network Address.

IQ Computer to Direct/Server Satellite Network:

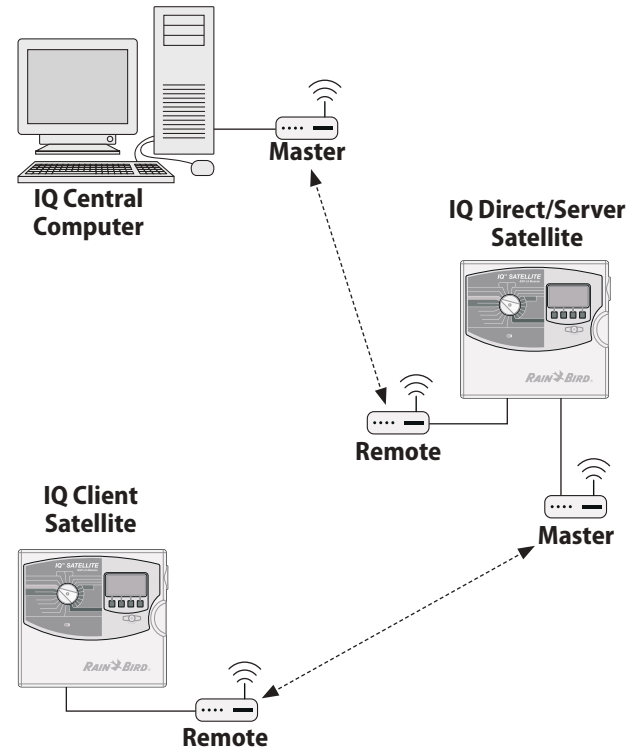
- Master - Used at the IQ Central Computer to communicate with a Direct or Server Satellite.
- Remote – Used at the Direct or Server Satellite to communicate with the IQ Central Computer.

Server Satellite to Client Satellite Network:

- Master - Used at the Server Satellite to communicate with Client Satellites.
- Remote – Used by Client Satellites to communicate with the Server and other Client Satellites.

Extension radios may be used as a repeater between any two radios when a signal boost is required.

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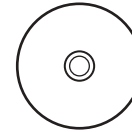


Programming Kit

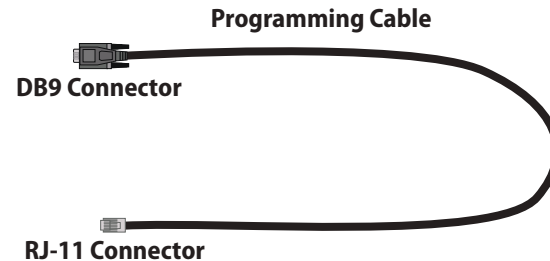
After installation, IQ SS-Radios are configured using the IQ SS-Radio Programming Kit. The included programming cable is plugged into the RJ-11 Programming Diagnostic port on the back of the radio, and then into a portable/laptop computer. The MDS TransNET Radio Configuration software must be installed on the computer for configuration.



NOTE: The MDS TransNET software will not be able to connect to the radio if the COM port the programming cable is using is not setup properly. If the MDS software is not connecting to the radio, refer to the MDS COM Port Setup section in the Appendix.



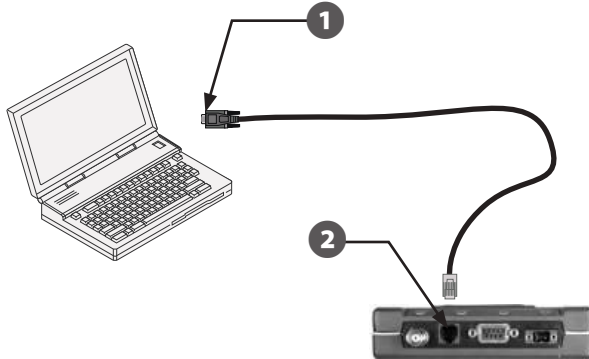
**MDS TransNET Radio Configuration
Installation CD**



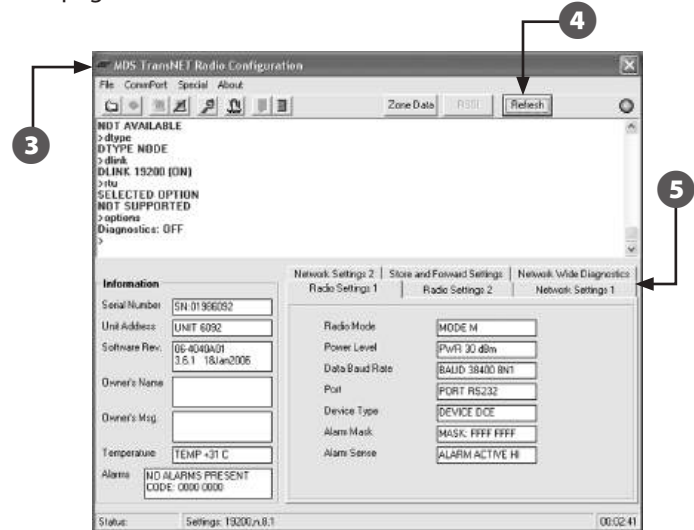
Master Radios

To configure the Master radio at the IQ computer:

- 1 Connect the serial end of the programming cable to a COM Port on the computer to be used for configuring the radio. (This can be the IQ Central Computer if there is an available COM port.)
- 2 Connect the RJ-11 end of the programming cable to the Programming Diagnostic port on the radio.



- 3 Open the MDS TransNET Radio Configuration utility.
- 4 Select Refresh at the top right of the MDS TransNET window.
- 5 All current settings for the radio will display in the six tabs located at the center-right of the MDS TransNET home page.



NOTE: The Unit Address listed in the Information column will be used in the Direct or Server Satellite Communication section. Record it here: _____

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6 Change the settings displayed in the MDS TransNET software to match those shown in the following tables.

Radio Settings 1	
Radio Mode	MODE M
Power Level	PWR 30 dBm
Data Baud Rate	BAUD 38400 8N1
Port	PORT RS232
Device Type	DEVICE DCE
Alarm Mask	MASK: FFFF FFFF
Alarm Sense	Alarm active HI

Radio Settings 2	
CTS Delay	CTS 1 ms
CTSHOLD Delay	CTSHOLD n/a
Receive Time Out Timer	RXTOT NONE
Receive Data Holdover	RXD 0 ms
Sleep Mode	SLEEP n/a
Low Power Mode HOLD	LPMHOLD 20 ms
Output Triggering	OT OFF

Network Settings 1	
Network Address	ADDR **** (See NOTE)
Clock Sync Address	NONE
Hop Time	HOP TIME 7
Skipped Zones	SKIP NONE
Low Power Mode Setting	LPM 0

Network Settings 2	
Repeat Count	REPEAT 2 TIMES
Retry Count	RETRY 2 TIMES
Forward Error Correction	FEC OFF
Data Buffering	BUFF OFF
Minimum RSSI	MRSSI NONE

Store and Forward Settings	
Store and Forward	SAF OFF
Extension Address	XADDR 0
Extension Map	
Primary Extension Addr.	XPRI 0
Extension RSSI	XRSSI NONE
Show Sync	Not Available

Network Wide Diagnostics	
DTYPE	DTYPE NODE
DLINK	DLINK 19200 (ON)
Software RTU	RTU 0 (OFF)
Diagnostic Options	Diagnostics: ON



NOTE: The Network Address MUST be different than the address used for the Master radio at the IQ Satellite. It is recommended to use the last 4 digits of the Master radio serial number. (The serial number is listed on the MDS home page.) Record the Network Address here: _____

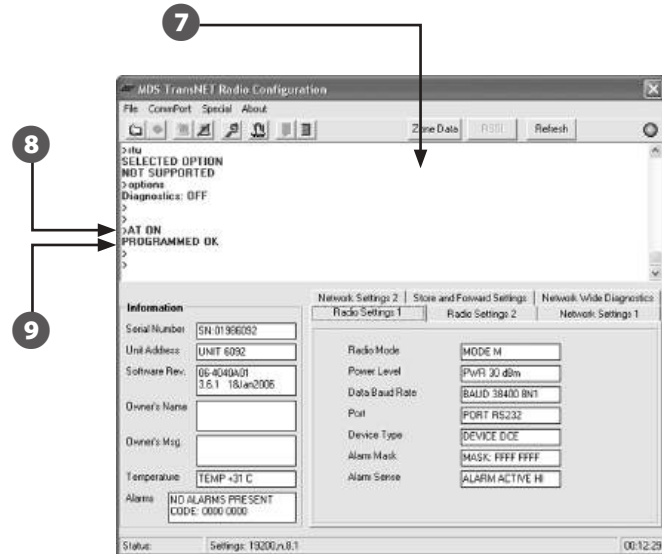
For the Master Radio at the IQ computer that will communicate with Direct and Server Satellites ONLY, perform the following steps:

- 7** Move the cursor to the upper display section of the MDS window.
- 8** At the > prompt, type AT (space) ON, then press enter.
- 9** "Programmed OK" will be displayed.

IQ Computer COM Port Setup:

If a modem is not setup and assigned to the COM port used by the Master radio (not the port used by the programming cable), the radio will not work even when configured properly.

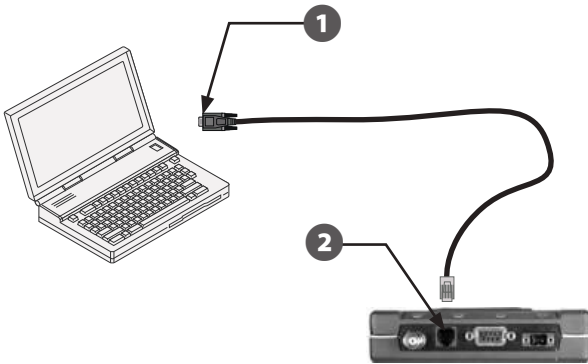
When loading the IQ software, a modem is usually set up automatically in Windows. To verify modem settings or setup another COM port, see the Master Radio Modem Setup section in the Appendix.



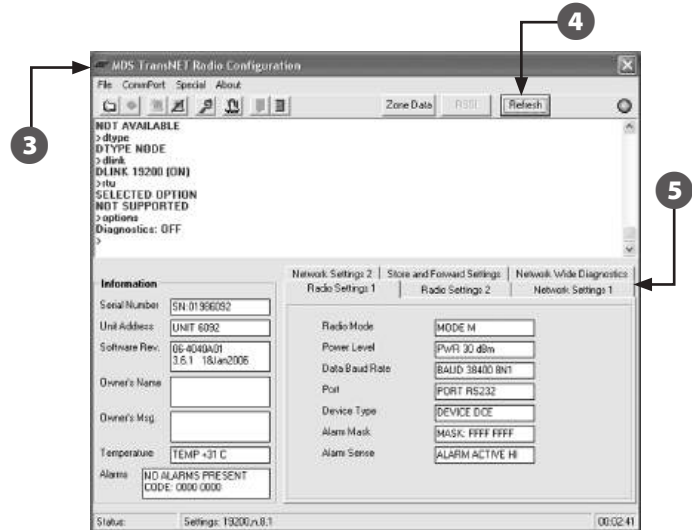
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To configure a Master radio at an IQ Server Satellite:

- 1 Connect the serial end of the programming cable to a COM Port on the computer to be used for configuring the radio.
- 2 Connect the RJ-11 end of the programming cable to the Programming Diagnostic port on the radio.



- 3 Open the MDS TransNET Radio Configuration utility.
- 4 Select Refresh at the top right of the MDS TransNET window.
- 5 All current settings for the radio will display in the six tabs located at the center-right of the MDS TransNET home page.



- 6 Change the settings displayed in the MDS TransNET software to match those shown in the following tables.

Radio Settings 1	
Radio Mode	MODE M
Power Level	PWR 30 dBm
Data Baud Rate	BAUD 38400 8N1
Port	PORT RS232
Device Type	DEVICE DCE
Alarm Mask	MASK: FFFF FFFF
Alarm Sense	Alarm active HI

Radio Settings 2	
CTS Delay	CTS 1 ms
CTSHOLD Delay	CTSHOLD n/a
Receive Time Out Timer	RXTOT NONE
Receive Data Holdover	RXD 0 ms
Sleep Mode	SLEEP n/a
Low Power Mode HOLD	LPMHOLD 20 ms
Output Triggering	OT OFF

Network Settings 1	
Network Address	ADDR **** (See NOTE)
Clock Sync Address	NONE
Hop Time	HOP TIME 7
Skipped Zones	SKIP NONE
Low Power Mode Setting	LPM 0

Network Settings 2	
Repeat Count	REPEAT 2 TIMES
Retry Count	RETRY 2 TIMES
Forward Error Correction	FEC OFF
Data Buffering	BUFF OFF
Minimum RSSI	MRSSI NONE

Store and Forward Settings	
Store and Forward	SAF OFF
Extension Address	XADDR 0
Extension Map	
Primary Extension Addr.	XPRI 0
Extension RSSI	XRSSI NONE
Show Sync	Not Available

Network Wide Diagnostics	
DTYPE	DTYPE NODE
DLINK	DLINK 19200 (ON)
Software RTU	RTU 0 (OFF)
Diagnostic Options	Diagnostics: ON



NOTE: The Network Address MUST be different than the address used for the Master radio at the IQ computer. It is recommended to use the last 4 digits of the Master radio serial number. (The serial number is listed on the MDS home page.) Record the Network Address here: _____

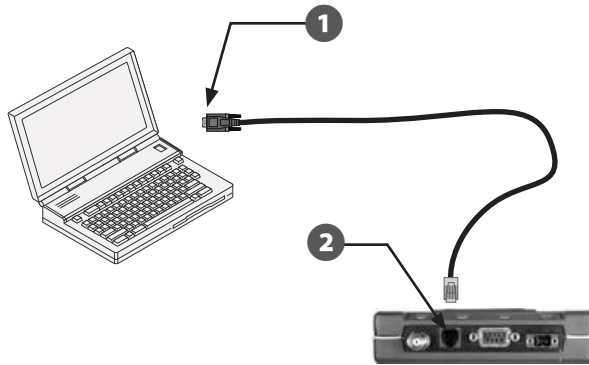
20 IQ Spread Spectrum Radio

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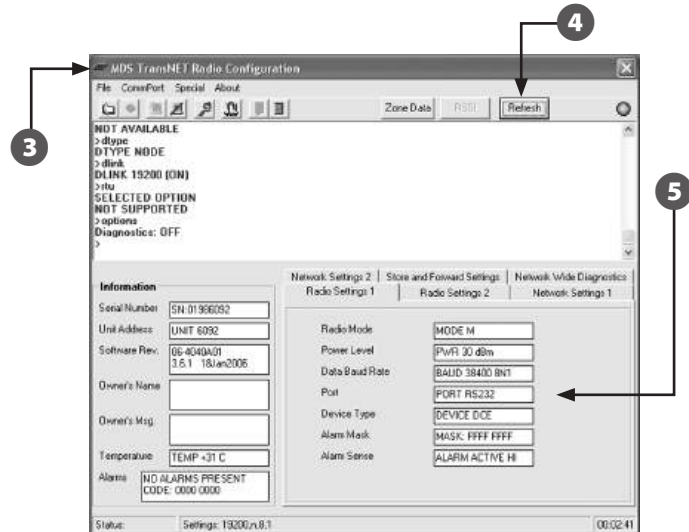
Remote Radios

To configure a Remote radio at an IQ Satellite:

- 1 Connect the serial end of the programming cable to a COM Port on the computer to be used for configuring the radio.
- 2 Connect the RJ-11 end of the programming cable to the Programming Diagnostic port on the radio.



- 3 Open the MDS TransNET Radio Configuration utility.
- 4 Select Refresh at the top right of the MDS TransNET window.
- 5 All current settings for the radio will display in the six tabs located at the center-right of the MDS TransNET home page.



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6 Change the settings displayed in the MDS TransNET software to match those shown in the following tables.

Radio Settings 1	
Radio Mode	MODE R
Power Level	PWR 30 dBm
Data Baud Rate	BAUD 38400 8N1
Port	PORT RS232
Device Type	DEVICE DCE
Alarm Mask	MASK: FFFF FFFF
Alarm Sense	Alarm active HI

Radio Settings 2	
CTS Delay	CTS 1 ms
CTSHOLD Delay	CTSHOLD n/a
Receive Time Out Timer	RXTOT NONE
Receive Data Holdover	RXD 0 ms
Sleep Mode	SLEEP n/a
Low Power Mode HOLD	LPMHOLD 20 ms
Output Triggering	OT OFF

Network Settings 1	
Network Address	ADDR **** (See NOTE)
Clock Sync Address	Not Available
Hop Time	Not Available
Skipped Zones	Not Available
Low Power Mode Setting	Not Available

Network Settings 2	
Repeat Count	Not Available
Retry Count	Not Available
Forward Error Correction	Not Available
Data Buffering	Not Available
Minimum RSSI	MRSSI NONE

Store and Forward Settings	
Store and Forward	Not Available
Extension Address	Not Available
Extension Map	
Primary Extension Addr.	XPRI 0
Extension RSSI	XRSSI NONE
Show Sync	Not Available

Network Wide Diagnostics	
DTYPE	DTYPE NODE
DLINK	DLINK 19200 (ON)
Software RTU	RTU 0 (OFF)
Diagnostic Options	Diagnostics: ON

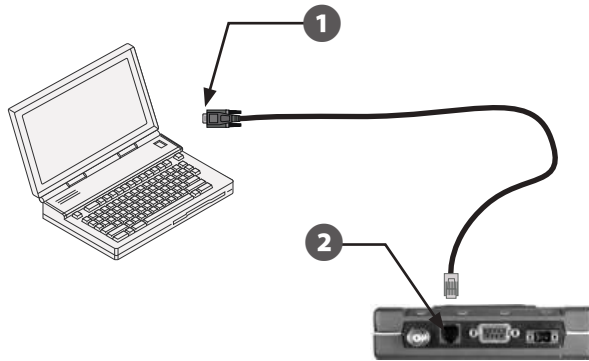


NOTE: The Network Address MUST be the same as the Master radio in the network of the Remote. (This will be either the Network Address of the Master radio at the IQ computer, or the Network Address of the Master radio at the IQ Server Satellite).

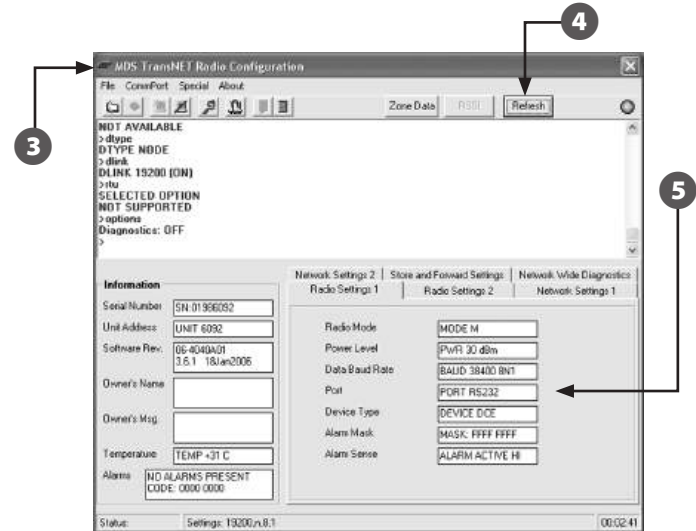
Extension Radios

To configure an Extension radio:

- 1 Connect the serial end of the programming cable to a COM Port on the computer to be used for configuring the radio.
- 2 Connect the RJ-11 end of the programming cable to the Programming Diagnostic port on the radio.



- 3 Open the MDS TransNET Radio Configuration utility.
- 4 Select Refresh at the top right of the MDS TransNET window.
- 5 All current settings for the radio will display in the six tabs located at the center-right of the MDS TransNET home page.



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6 Change the settings displayed in the MDS TransNET software to match those shown in the following tables.

Radio Settings 1	
Radio Mode	MODE X
Power Level	PWR 30 dBm
Data Baud Rate	BAUD 38400 8N1
Port	PORT RS232
Device Type	DEVICE DCE
Alarm Mask	MASK: FFFF FFFF
Alarm Sense	Alarm active HI

Radio Settings 2	
CTS Delay	CTS 1 ms
CTSHOLD Delay	CTSHOLD n/a
Receive Time Out Timer	RXTOT NONE
Receive Data Holdover	RXD 0 ms
Sleep Mode	SLEEP n/a
Low Power Mode HOLD	LPMHOLD 20 ms
Output Triggering	OT OFF

Network Settings 1	
Network Address	ADDR ****
Clock Sync Address	Not Available
Hop Time	Not Available
Skipped Zones	Not Available
Low Power Mode Setting	Not Available

Network Settings 2	
Repeat Count	Not Available
Retry Count	Not Available
Forward Error Correction	Not Available
Data Buffering	Not Available
Minimum RSSI	MRSSI NONE

Store and Forward Settings	
Store and Forward	Not Available
Extension Address	Not Available
Extension Map	
Primary Extension Addr.	XPRI 0
Extension RSSI	XRSSI NONE
Show Sync	Not Available

Network Wide Diagnostics	
DTYPE	DTYPE NODE
DLINK	DLINK 19200 (ON)
Software RTU	RTU 0 (OFF)
Diagnostic Options	Diagnostics: ON



NOTE: The Network Address MUST be the same as the Master radio in the network of the Extension. (This will be either the Network Address of the Master radio at the IQ computer, or the Network Address of the Master radio at the IQ Server Satellite).

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Programming

Overview

After all the SS-Radios have been configured, radio communications between the IQ Computer and the Satellite Controllers must be enabled using the Rain Bird IQ™ Central Control System software on the IQ computer.

If Extension radios are necessary, the Store and Forward feature of the MDS TransNET Configuration software must be enabled and programmed.

If assistance is required when using the IQ Central Control System software or programming the Store and Forward feature, contact the local Authorized Rain Bird Distributor or the ASP.

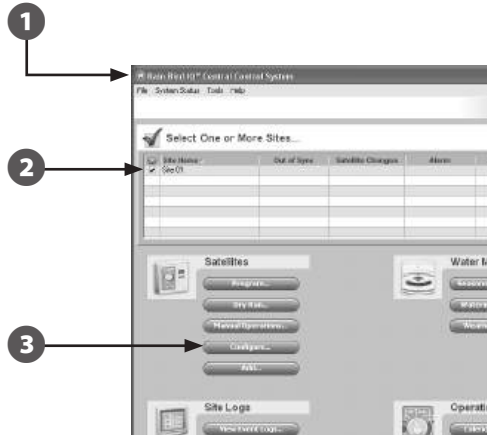


Rain Bird IQ™ Central Control System

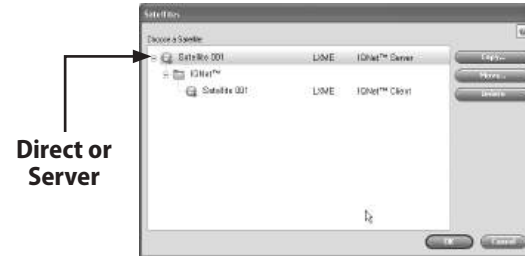
Direct or Server Satellite Communication

To program the Master Radio to communicate with the Direct or Server Satellite from the IQ computer:

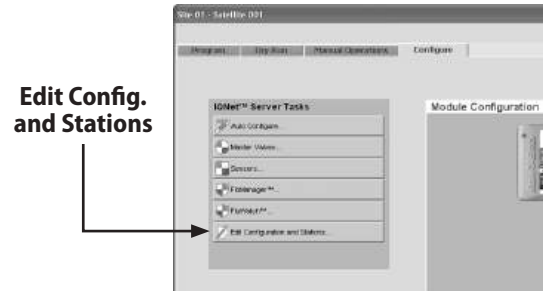
- 1 At the IQ computer, start the Rain Bird IQ™ program.
- 2 Click the check box next to the desired Site.
- 3 Under Satellites click on Configure.



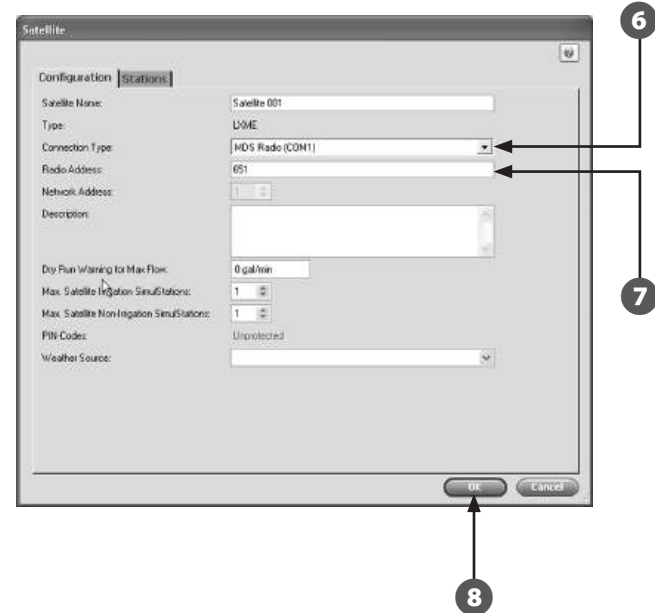
- 4 From the Satellite list double-click on the Direct or Server Satellite to be configured.



- 5 On the Configure tab, click on Edit Configuration and Stations.



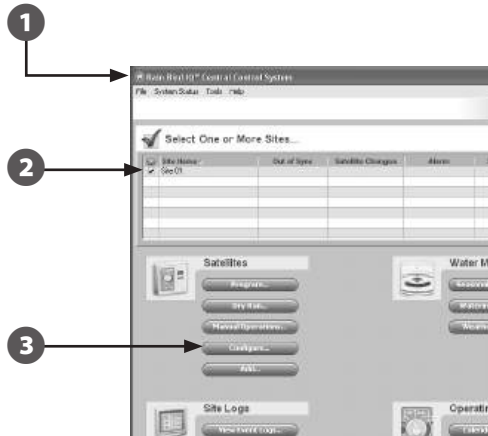
- 6 In the Connection Type drop down select MDS Radio and the COM Port used to connect the radio.
- 7 Enter the radio address of the radio you have connected to your computer. (The unique "Unit Address" is displayed toward the left side of the MDS TransNET software home page.)
- 8 Click OK.



Client Satellite Communication

To program Client Satellites to communicate with the Server Satellite:

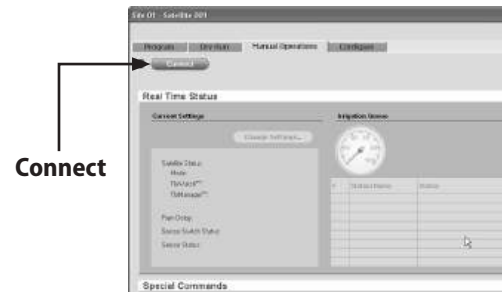
- 1** At the IQ computer, start the Rain Bird IQ™ program.
- 2** Click the check box next to the desired Site.
- 3** Under Satellites click on Configure.



- 4** From the Satellite list double-click on the Client Satellite to be configured.



- 5** On the Manual Operations tab, click on Connect.



Extension Radio Communication

To set up Extension radios, the Store and Forward feature of the MDS TransNET Configuration software must be used.

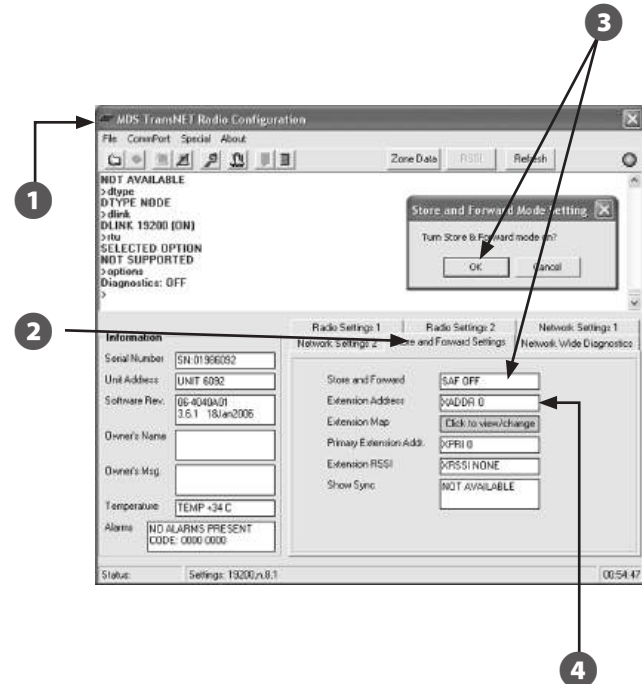
Changes to the radio settings of the Master, Remote, and Extension radios in a network are made using the IQ SS-Radio Programming Kit (IQSSRPKIT).

For assistance with Store and Forward programming, please contact the ASP or the local Authorized Rain Bird Distributor.

To program Store and Forward at the Master radio:

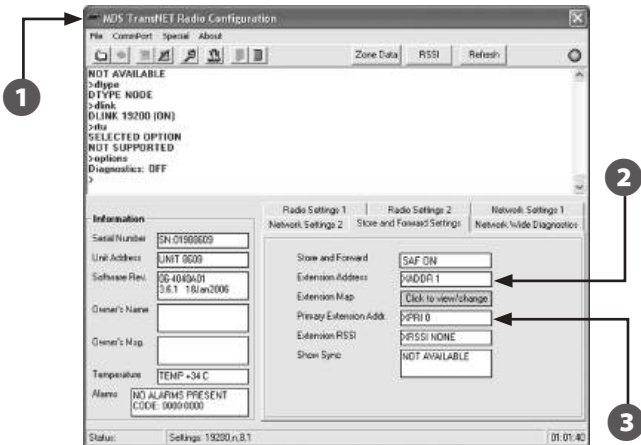
- 1 Start the MDS TransNET Configuration software.
- 2 Select the Store and Forward tab.
- 3 Click on SAF OFF. In the pop-up box, Click on OK to turn on Store and Forward.
- 4 Verify the setting for the Extension Address (XADDR) is a unique address within the network, from 0-31.

NOTE: Every radio in the network MUST have a unique Extension Address (XADDR).



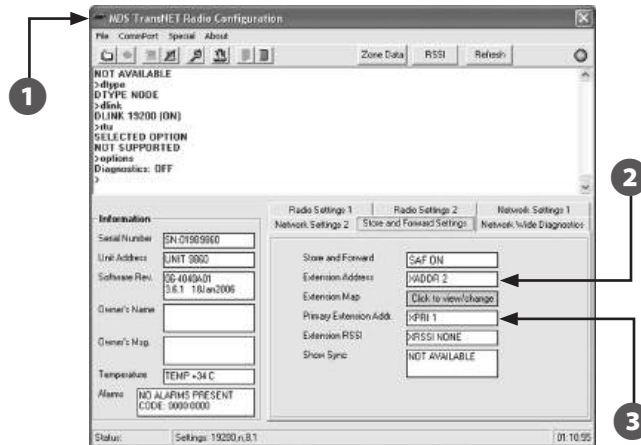
To program an Extension radio to communicate with another radio:

- 1 At the Extension radio, start the MDS TransNET Configuration software.
- 2 On the Store and Forward tab, enter (or verify) a unique Extension Address (XADDR) from 0-31 for the radio.
- 3 Enter the Extension Address (XADDR) of the radio that this Extension Radio needs to communicate with in the Primary Extension Address (XPRI) field.



To program another radio to communicate with an Extension radio:

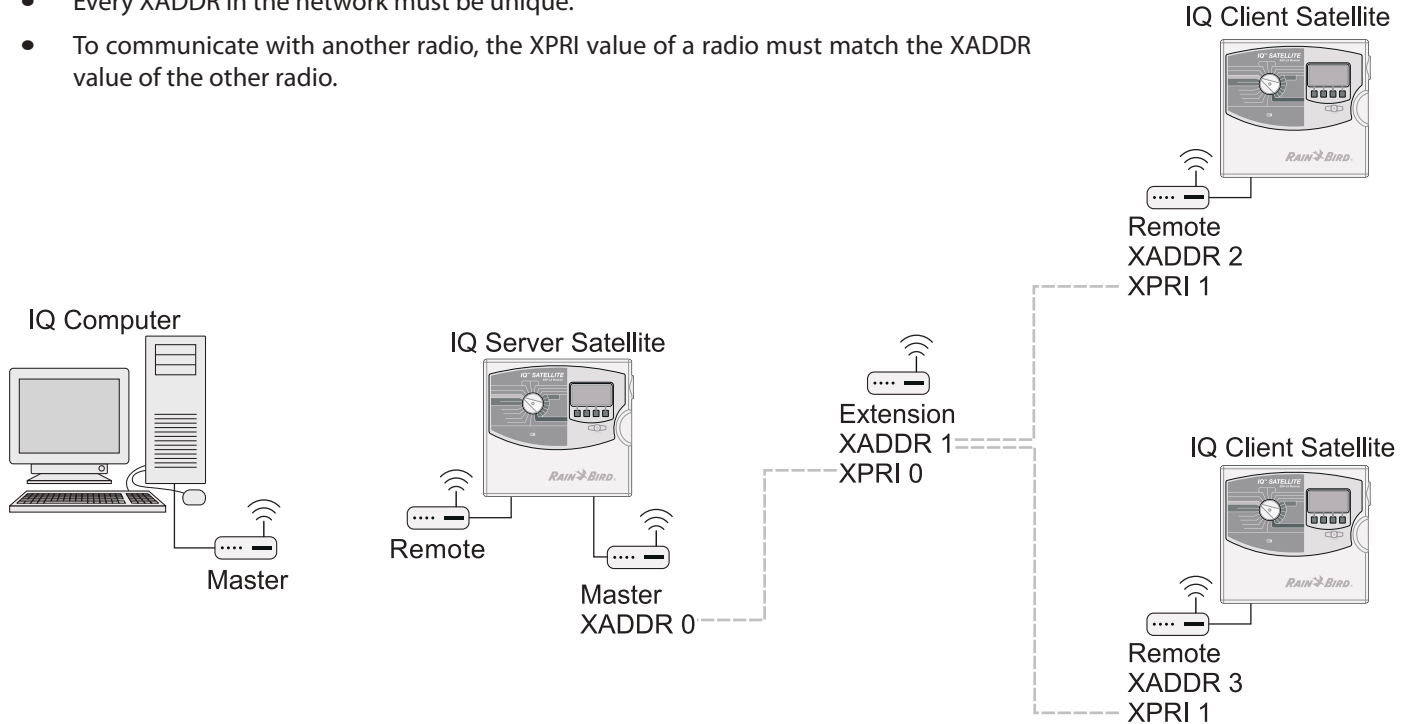
- 1 At the radio, start the MDS TransNET Configuration software.
- 2 On the Store and Forward tab, enter (or verify) a unique Extension Address (XADDR) from 0-31 for the radio.
- 3 Enter the Extension Address (XADDR) of the Extension radio that this radio needs to communicate with in the Primary Extension Address (XPRI) field.



32 IQ Spread Spectrum Radio

This illustration shows the relationship between Extension Addresses (XADDR) and Primary Extension Addresses (XPRI) for a Store and Forward system.

- Every XADDR in the network must be unique.
- To communicate with another radio, the XPRI value of a radio must match the XADDR value of the other radio.



Appendix

Optional Antennas

Antenna Requirements

The IQ SS-Radio comes with a rubber duck antenna which has a 1dB gain. Some applications may require stronger or taller antennas in order to improve communication between radios.

The Site Survey conducted by the Authorized Service Provider (ASP) will determine the antenna requirements for the system.

Additional antennas are available through Rain Bird Services Corporation.

Attenuators

Attenuators are used to reduce signal strength. If the signal is too strong it can “bounce”, reducing system performance. Also, radios in close proximity to each other may need signal strength be reduced to prevent interference.

For assistance with signal strength issues please contact your local Authorized Rain Bird Distributor.

Surge Protection

Surge protection such as a Poly-Phaser should be used on all antenna installations where the cable length is more than 10' in length.

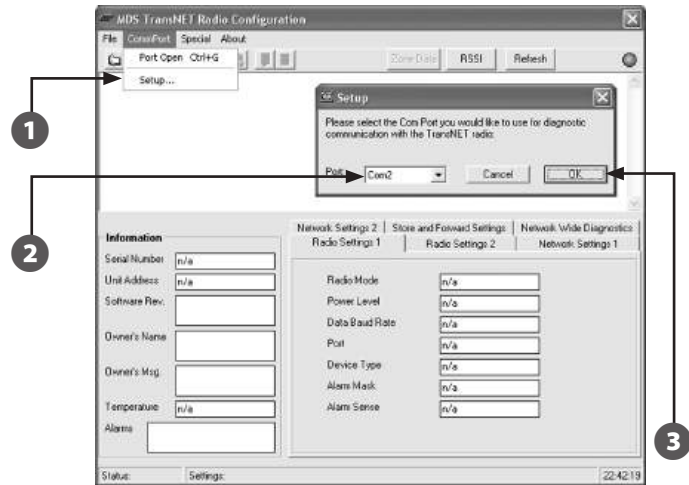
A surge protection device is installed where the antenna cable is connected to the antenna, then grounded by connecting a bare copper wire to a grounding system.

MDS COM Port Setup

The MDS TransNET software will not be able to connect to the radio if the COM port the programming cable is using is not setup properly.

To enable the programming cable COM port:

- 1 On the MDS TransNET Configuration software home page, select CommPort -> Setup... from the menu bar.
- 2 In the Setup window, select the COM port (COM1, COM2, etc.) that the programming cable is using.
- 3 Click OK.



Master Radio Modem Setup

If a modem is not setup and assigned to the COM port used by the Master radio, the radio will not communicate with the IQ computer.

To verify IQ computer modem settings or setup another COM port:

- 1** At the IQ computer, select Start -> Settings -> Control Panel.
- 2** From the Control Panel, open Phone and Modem Options.
- 3** Select the Modems tab.
- 4** Click the "Add..." button to open the Add Hardware Wizard.
- 5** On the Install New Modem page, check the "Don't detect my modem; I will select it from a list" option. Click "Next".
- 6** From the Models list, select the "Communications cable between two computers" option. Click "Next".
- 7** Choose the "Selected ports" radio button, and select the port (COM1, COM2) that the Master radio serial cable is using. Click "Next".
- 8** When the modem has been set up successfully, click "Finish".
- 9** On the Modems tab of the Phone and Modem Options window, select the modem from the list for the COM port now in use. Click "Properties".
- 10** On the Modem tab of the "communications cable between..." window, set the Maximum Port Speed to 38400. Click "OK".
- 11** Close Phone and Modem Options.
- 12** From the Control Panel, open System.
- 13** From the Hardware tab, select Device Manager.
- 14** Expand the Ports tree by clicking the "+". Double-click the COM port in use.
- 15** In the COM Port Properties window, select the Port Settings Tab.
- 16** Verify the following parameters: Bits per second = 38400, Data bits = 8, Parity = None, Stop Bits = 1, Flow Control = 1.
- 17** Click "OK" and close the Device Manager.

36 IQ Spread Spectrum Radio

Troubleshooting

If the system is not working or not performing properly, use this section as a guide to troubleshoot the issue or problem. Contact the ASP or Rain Bird for technical assistance if needed.

LED Indicators

The LED status indicators are an important troubleshooting tool and should be checked first.

LED	Indication
PWR (continuous)	Radio is powered on
PWR (Flashing)	5x per second, fault indication - See Alarm Codes
PWR (Off)	Radio is powered off or in Sleep mode
SYNC	Radio is syncing with other radios
TXD	Data is being transmitted to another radio
RXD	Data is being received from another radio



System Checklists

Basic Radio Operation

- Verify every radio is powered on and the power supply is providing proper voltage.
- Verify the antenna system is properly aligned.
- Check the configuration of the radio settings, especially Operating Mode (MODE), Network Address (ADDR), and interface Baud Rate (BAUD).
- Check all cables, wiring, and connections.

Radio Interference

- Verify that each radio is programmed with a unique network address. Nearby systems should be programmed with their own unique network address.
- If an omnidirectional antenna is used, try directional antennas. This will often limit interference.

Store-and-Forward Systems

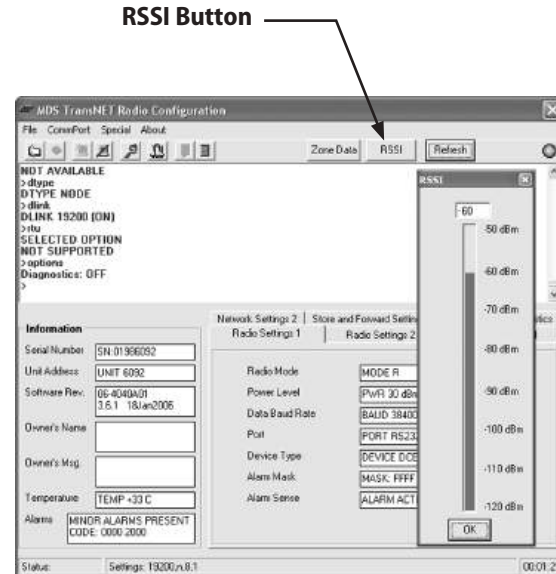
- Verify SAF is enabled on the Master Radio.
- Look for duplicate XADDR values on MODE M and MODE X radios.

Check Radio Signal Strength

Signal Strength can be displayed for a Remote Radio or Extension Radio by clicking on the RSSI (Received Signal Strength Indicator) tab. RSSI cannot be read at the Master Radio.

In the MDS TransNET Radio Configuration window, click on the RSSI button. A dialog box showing RSSI value will be displayed.

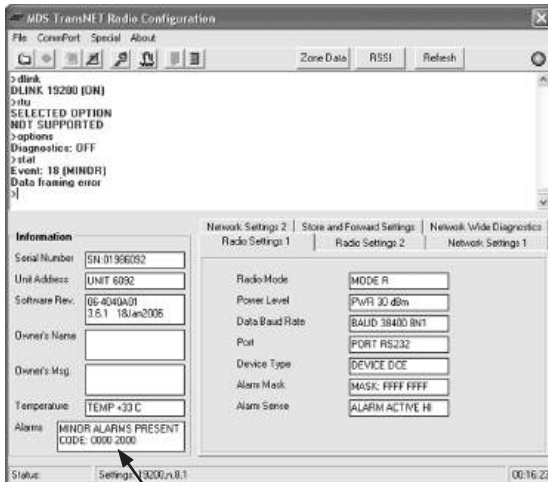
- The scale should display a minimum of -90 dBm and a maximum of -50 dBm.
- To increase signal strength use an antenna with a high dB gain and/or increase the height.
- To decrease signal strength, use an attenuator or decrease the power setting in the radio.



Alarm Codes

Alarm codes are displayed in the lower left side of the MDS TransNET Radio Configuration home page.

A brief code description can be obtained by typing in “Stat” at the terminal window prompt, or refer to the Alarm Code table for details on common alarms.



Alarm Codes

Alarm Code	Alarm Type	Description
00	Major	The network address is not programmed.
01	Major	Improper firmware detected for the radio model.
04	Major	One or more of the programmable synthesizer loops is reporting an out-of-lock condition.
08	Major	The system is reporting that it has not been calibrated. Factory calibration is required for proper radio operation.
10	Major	The DSP was unable to properly program the system to the appropriate defaults. A hardware problem may exist.
12	Major	Receiver time-out alarm.
16	Minor	The Unit Address is not programmed.
17	Minor	A data parity fault has been detected on the DATA connector. This may indicate a parity rate mismatch between the radio and the RTU.
18	Minor	A data framing error has been detected on the DATA connector. This may indicate a baud rate mismatch between the radio and the RTU.
29	Minor	RF output power fault detected. Check antenna, feedline, and connectors.
30	Minor	The system is reporting an RSSI reading below -105 dBm.
31	Minor	The radio's internal temperature is approaching an out-of-tolerance condition, which may lead to radio failure.



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